

ARMY MEDICAL LIBRARY

FOUNDED 1836



WASHINGTON, D.C.

sent to — Army Medical

RECEIVED

MAY - 4 1931

29/9 —

UNIVERSITY OF WASHINGTON
SCHOOL OF MEDICINE LIBRARY



SELECTIONS
FROM MY PORTFOLIO:

COMPRISING

Lectures and Essays

ON POPULAR AND SCIENTIFIC SUBJECTS.

BY

ADDISON P. DUTCHER, M. D.

(1818-1884)

PITTSBURGH:

PRINTED BY W. S. HAVEN, CORNER OF MARKET AND SECOND STREETS.

1858.

Annex

W9

D9753

1858

6.1

0020

PREFACE.

THE most of these Lectures and Essays have been already published in the popular journals of the day, and the favorable reception they have met with, and the desire of extending their usefulness, has induced me to incorporate them in a volume. Some of the Essays have been entirely re-written, while others have been slightly altered or corrected, as the nature of the case demanded. In some of the Lectures the language is occasionally changed, and some expressions modified; but the spirit and matter remain unaltered. In this shape I commit it to the public ordeal, to make its own way, with the hope it will be the means of advancing the cause of physical and mental improvement, and thereby promoting the welfare and general happiness of mankind.

A. P. D.

ENON VALLEY, PA., October, 1858.

TABLE OF CONTENTS.

	PAGE.
I. MEANS OF MENTAL IMPROVEMENT, -	7
II. THE MEANS OF SUCCESS, - -	22
III. OUR REPUBLICAN INSTITUTIONS, -	33
IV. PROGRESS, EDUCATION AND PHYSIOLOGY,	49
V. PHYSICAL AND MENTAL CHARACTERIS- TICS OF MAN, - - - -	53
VI. THE FUNCTIONS OF THE BRAIN, - -	73
VII. PHYSIOLOGY OF DIGESTION, - -	99
VIII. ABSORPTION AND SECRETION, - -	114
IX. THE GASTRIC JUICE, - - -	123
X. THE DIFFERENT KINDS OF FOOD, -	133
XI. ANIMAL HEAT: ITS NATURE AND IMPORT- ANCE, - - - - -	147
XII. BATHING: ITS USE IN HEALTH, - -	156
XIII. EXERCISE: ITS PHYSIOLOGY AND UTIL- ITY, - - - - -	166
XIV. THE PASSIONS: THEIR INFLUENCE UPON THE BODY, - - - - -	174
XV. ALCOHOL: ITS NATURE AND INJURIOUS EFFECTS, - - - - -	197
XVI. TOBACCO: ITS NATURE AND EFFECTS,	212
XVII. OPIUM: ITS NATURE AND EFFECTS, -	226

SELECTIONS FROM MY PORTFOLIO.

I.

Means of Mental Improvement.

INTRODUCTION.

MAN, without intellectual culture and moral illumination, is a ferocious, sensual and superstitious being. The external world affords some pleasure to his animal propensities, but it confounds his moral and intellectual faculties. Nature exhibits to his mind a mighty chaos of events, and a dread display of power. The chain of causation appears too intricate to be unraveled, and the power too stupendous to be controlled.

Order and beauty, indeed, occasionally gleam forth to his eye, from detached portions of creation, and seem to promise happiness and joy; but more frequently clouds and darkness brood over the scene, and disappoint his fondest expectations. Evil seems so mixed up with good, that he regards it either as its direct product, or its inseparable accompaniment. Nature is never contemplated with a clear perception of its adaptation to the

purpose of promoting the true enjoyment of man, or with a well-founded confidence in the wisdom and benevolence of its Author.

Man, when civilized and illuminated by knowledge, on the other hand, discovers in the objects around him a scheme beautifully arranged for the gratification of all his powers, animal, moral and intellectual; he recognizes in himself the intelligent and accountable subject of an all-bountiful Creator; and in joy and gladness desires to study his Maker's works, to ascertain his laws, that he may yield to them a steady and willing obedience.

Without undervaluing the pleasures of his animal nature, he tastes the higher, more refined, and more enduring delights of his moral and intellectual capacities, and he then calls aloud for those means so indispensable to the full enjoyment of his natural powers.

To enumerate and briefly consider some of these means, is the object of this lecture. And at the head of all the means of mental improvement we place

READING.

Before the discovery of the art of printing, this fountain of knowledge was accessible only to the chosen few; but now all may come and drink freely, "without money and without price." And books have become so numerous, and treat of such a vast variety of subjects, that it requires a good and sound judgment to decide which are worthy of perusal and study. To the youthful mind, this is a subject of infinite importance. If a taste is once formed in the morning of life for frivolous and

profane reading, it stamps the mind with injurious impressions, which will require years to eradicate. Hence, at the very commencement of a course of mental improvement, I would recommend a systematic and careful study of the BIBLE, satisfied, from personal experience, that this book, more than any other, is of itself able to arouse and invigorate the intellect. Whether it be considered as unfolding the philosophy of human nature, or the course of human events; whether it be adopted as a book for the young child, or for the wisest statesman; whether it be regarded as calling into exercise the reasoning powers, or as nourishing and chastening the fire of imagination, it stands unrivaled in its influence upon the intellectual character.

It excites the mind to the most intense and sometimes painful study; it opens before it the most abstruse wonders of philosophy; it presents truth to the mind, now exceedingly simple and beautiful, and then incomparably sublime and glorious, but always pure as the stream that gushes from the crystal fount, and as sparkling as the dew-drop on the drooping lily.

“This book, this holy book, in every line
Marked with the seal of high divinity,
On every leaf bedewed with drops of love
Divine, and with th’ eternal heraldry
And signature of God Almighty stamped
From first to last.” * * * *

I know of no volume in the world so well fitted to disarm the prejudices and hostilities of the mind, as the Bible. Let its touching tenderness sink deep into your hearts, and its atmosphere of purity surround you in all your ways.

PHYSIOLOGY.

Next to the Bible, there is no study more important than physiology. By a careful study of this science, we become acquainted with the functions performed by the different organs of the living body. The necessity of an intimate acquaintance with this science, arises from the fact that we cannot violate a single law of our organization without suffering for it sooner or later. No matter how pure or elevated may be our spiritual condition, or benevolent our actions, we cannot escape the operation of the laws of our physical being. They are immutable, and the penalty is certain and inevitable.

Throughout creation, we find that certain causes produce certain effects. For example, if we apply fire to combustible materials, we expect them to burn. If we cast a body from the border of a precipice, it must fall down into the chasm beneath. To expect the reverse, would be to look for a miracle. So if we overstrain our lungs or muscles, we suffer in those parts, in proportion as we violate the laws which govern them. Hence the importance of becoming acquainted with this science.

But physiology, aside from all its direct and practical bearings on the physical welfare of mankind, constitutes the most interesting subject of study among the sciences. The human system, how complicated and wonderful! In its structure we behold a concentration of all that is harmonious and beautiful in the kingdom of nature. Let it be studied with care, and it will expand the intellect, and impart a pleasure to the mind far above that

which the miser feels in the groveling contemplation of his hard-sought pelf.

PHRENOLOGY.

Nearly allied to the study of physiology, is the science of phrenology—the *only true philosophy of mind*. Its study is useful, because it furnishes us with the only accurate rule for estimating our own powers of mind, and those who surround us. It enables us to appreciate qualities justly, which we do not ourselves possess, and, therefore, are apt to underrate or make no allowance for; and it enables us to set a just value on the various motives by which conduct is influenced, and to cherish the highest.

So far as an acquaintance with the principles of mind is attainable, I know of no source from which it can come, but phrenology. If instead of definite demonstrable truth, phrenology presented only the conflicting vagaries of metaphysical school men, I should never be found recommending its study to any one. “Gall, Spurzheim, and Combe, have done for the science of mind as great a work as Bacon did for physics, or the laws of matter.”*

Study this science carefully, and you will find it an important means of mental improvement.

THE NATURAL SCIENCES.

The study of the natural sciences, such, for instance, as astronomy, geology, mineralogy, zoology, botany and chemistry, cannot fail to be the

* Horace Mann’s “Thoughts for Young Men.”

means of mental improvement and delight to the most obscure individual in society. By an intimate acquaintance with these sciences, we become more thoroughly convinced of the being and glory of God.

Turn our thoughts which way we will, from the greatest to the least object that we behold; from the orient star that glitters in the heavens, to the insect that creeps upon the ground; from the awful thunder that rolls in the skies, to the flower that flourishes in the field, all things testify a profound skill, a mighty and all-powerful hand, before which we must bow.

The works of nature are displayed on every hand with astonishing magnificence. We walk through the earth as through the apartments of a splendid palace, which ought to fill every spectator with wonder and delight. All the works which our power can erect, all the ornaments which human art can contrive, are feeble and trifling in comparison with those glories which nature everywhere presents to our view.

The immense arch of the heavens, the splendor of the sun in his meridian brightness, or the beauty of his rising and setting hours, the rich fields of landscape, and the boundless expanse of the ocean, are scenes which mock every rival attempt of human skill and labor.

POETRY, ETC.

Having added to the studies already enumerated, history, biography, the different branches of mathematics, natural, moral, and political philosophy, geography, we will then be prepared to read poetry,

and drink deep at her sparkling fount. No reading has a more powerful tendency to purify and exalt the mind, than poetry. The grand old fathers of English verse seem especially to do this.

There is scarcely a character in Shakespeare, whose contemplation does not make us better men. No one can read Milton without catching a spark of his celestial fire, and seeming to hear the chants of the redeemed. But we are too groveling to enjoy the lofty strains of the muse. We are too fond of raking among dust and ashes for dross, and therefore do not win immortal wealth, or catch glimpses of Paradise from her serene face.

OBJECTIONS TO READING ANSWERED.

Notwithstanding the great benefit to be derived from reading, there is a very general impression abroad in the world, that book knowledge of any sort is mere theory, whereas it is practical knowledge that is wanted. That practical knowledge is wanted in every department of society, we will freely admit; but that men are more practical than books, we deny. Nor is it books alone that abound in wild and extravagant theories; nor does all experience dwell outside of book covers.

What, I would ask, are all books on the useful sciences, but the universal experience of the world, with the coarser parts sifted out? Whereas, what is commonly called personal experience, is no more entitled to the name of experience than was the conduct of the man who carried the stone in one end of the bag, which was slung across his horse's saddle, and the wheat in the other; and who, when

urged to throw away the stone, and divide the grain, alleged as a reason for not complying with the advice, that his father and his grandfather had always carried their grain thus, and he believed it was the only correct way, having tested it by experience. Just such is the most of that which is claimed by the mass of book-haters to be experience, in opposition to what they consider the mere theories of books.

Many individuals complain that they have no taste for reading, and therefore derive no benefit from it. This distaste originates, nine times out of ten, from the fact that they do not understand what they read. And again, many persons are not benefited, because they read so rapidly, that they never pause to consider whether the opinions of the author they are reading are true or false, but as they read they adopt his opinions. This should not be. If his opinions are remembered, it is an exercise of memory alone, without judgment.

He who reads with profit, must exercise his judgment; weigh well the words as he proceeds. Does any part of the author's meaning appear obscure, he must reflect on the character of his writings, examine the context, and by it determine the exact meaning of the writer. By this method the reader enters into the spirit of the subject, and is capable of judging how far the authors opinions coincide with his own, or how far they are true or false.

READING SHOULD BE A HABIT.

But if we would derive anything like a full measure of benefit from reading, it must become a

fixed habit. It is not like breathing, one of those things which a man can be doing all the while. Ordinarily one cannot give even a day to the exercise, in exclusion of everything else. Hence it must be mingled with other engagements, without superseding them, or coming into conflict with them, filling up the numerous interstitial spaces of life that would otherwise be lost, or perhaps devoted to the purposes of evil.

In almost every man's history, there is a very considerable amount of unoccupied time, distributed into small parcels and broken up into fragments, forming the intervals between the periods of effort. For this time he must find a business, or waste it; and if he does waste it, the loss in the course of life will be no trifle. Now the charm of the habit of reading consists in the fact, that it appropriates these vacant moments with a frequency, system and regularity, that turns them to profitable account.

It is astonishing to observe, what one may do for the improvement of his mind, by an economical and judicious use of time. Some individuals have risen from the lowest obscurity to distinguished eminence, under the force of this single power. We squander a vast amount of time in small portions, lying between what we regard the necessary duties and engagements of life; and we shall continue to squander it, in the end making a most serious deduction from the value of existence, unless we form the habit of reading. This will take care of these fleeting moments, and stamp them with good results. Yet it must be a habit, and not an accident; a system, and not an occasional occurrence; a spasm

now and then will never do the work. No one will be a reader to the extent of his privilege or necessities, unless he is so by habit.

Next to reading, as a means of mental improvement, is the

ART OF CONVERSATION.

By conversation, we not only become acquainted with the sentiments of others, but we are enabled to communicate our own, and thus we may become mutual helps to each other in the great race of mental improvement. A man without conversation is like a miser, who lives only for himself.

The practice of an enlightened and chaste style of conversation, in almost every department of society, is too much neglected, and always will be, while the spirit of progressive improvement is absent. We all know how stale and unprofitable conversation becomes in circles, where changes of the weather, the latest fashions of dress, and the scandal of the vicinity, constitute the only materials for thought and conversation.

But enter those circles where an enlightened piety combines with intellectual discipline. How changed is the scene. From the thousand unfoldings of nature in the earth, in the air, and sky—from the memory of a multitude of ages long since departed—from the progress of art, science and religion—from the thousand inquiries of the mind, the awakened group derive their “thoughts that breathe and words that burn.”

In society like this, the powers of the mind are improved. Mind enlarges mind, language becomes

ardent with thought, and the human expression, both in aspect and voice, becomes ennobled with elevated emotions. There are powerful influences in conversation, when properly directed, adapted to improve the mind, and increase the happiness of man in his social relation.

WRITING OR COMPOSITION.

This may be regarded as a very important means of mental improvement. Few persons know the powers of their minds until they try them; and it is well known that practice is sure to produce facility of execution, consequently the advancement of the mind in knowledge and skill cannot be calculated. There are motives, both social and selfish, for exerting our faculties, and recording the result.

He who is learning to write clearly and methodically, is learning to reason logically and promptly; for method always insures perfection and speed.

There are many minute beauties in composition, which cannot be known, except by those who practice it. The various combinations of words, unity of sentences, emphasis and cadences, strength and harmony, are not to be learned by sight. A knowledge of the meaning of words may soon be acquired, but the science of uniting them in such a manner as to express our thoughts with clearness and elegance, is only learned by practice.

The powers of the pen, as an instrument of discipline, in mental improvement, is too much neglected by all young students. To make a commencement of the use of this important means, I would recommend each one of you to keep a journal of his own

personal history. After a very little practice, the work itself will be pleasant, and the improvement which it will promote is far greater than one who has not experienced it would expect.

The style should be a simple narrative of facts—chiefly descriptions of scenes through which you have passed, a memoranda in regard to important points of your history. Everything relating to your progress in knowledge, your plans for your own improvement, the books that you read, and the degree of interest which they excited, should be noted down. You will find by so doing, that it will exert a most powerful influence upon the whole intellectual character, and greatly promote its improvement.

TRAVELING.

This is also an important means of mental improvement. A journey, to an observing man, is as the opening of a new volume. He reads men and manners, events and circumstances, and improvements. His knowledge is increased, his prejudices are abated, his charities are kindled, his ties to his countrymen and his kind are strengthened.

A visit to one's distant friends is delightful; but are its uses often contemplated? Intercourse, in such circumstances, is usually an interchange of all the thoughts, views, and improvements, that prevail in different parts of the country.

Their talk is of stock, if you please, or it is of soils and grains, or it is of manufactures and trade, or it is of books and philosophers; but it is all good—good for somebody at least, good in the main for everybody.

Thus our steam boats are like floating saloons, and our rail roads like the air pipes of a mighty whispering gallery; and men are conversing with one another, and communicating their thoughts throughout the land.

Hence it is, that in this country, where the facilities of traveling are so great, that whatever moves, moves swiftly; if there be life at all, it is intrinsic life; if there be action of any sort, to any purpose, it must be intense action. The sluggish, the ineffective, are either crushed by the ponderous car of progression, or removed out of the way by its fender.

Let your intercourse, then, with your distant friends, be frequent. Travel whenever your means and time will permit, and you will find it a great source of mental improvement and physical health.

CONCLUSION.

We might enumerate other means of mental improvement, but it would prolong this lecture to an unusual length, and weary your patience. We would therefore remark, by way of conclusion, that it becomes each one of us to embrace these various means, and strive to pursue a perpetual system of mental improvement.

We should be continually eliciting new facts, and perusing from day to day the pages of some profound and original thinker, and we will see the time when it will come in demand, either for the illustration of some valuable truth, or the cultivation of some domestic virtue, or the advancement of some great political or moral reform.

Let not idleness or a want of confidence in your success, deter you from the undertaking. Neglect not these important means, for fear you shall not accomplish all you desire. What if you never become a Newton, a Gall, or Milton? Is that a reason why you should not avail yourself of what Newton discovered, or improve the mental faculties which Gall defined, or let your imagination travel on the strong wings which Milton left outspread?

Only begin, and then continue from day to day, and your success is certain. You have perception, and can understand a given statement of facts or principles, as well as others. You have reason, and can compare facts with facts, principle with principle, and conclusion with conclusion, until you arrive at a satisfactory decision. Your memory will be strengthened by exercise, and your imagination will be trained and inspired by habitual communion with great and gifted writers. What then shall hinder your improvement, if you are determined upon it?

Again, no individual, no matter how learned he may be, should be satisfied with his present attainments. To the true philosopher, there is no resting point. When Archimedes had discovered the mode of determining the relative quantities of gold and silver in Hiera's crown, did he rest satisfied with the new acquirement? No. The ecstasy he felt at the discovery, when he leaped from the bath and ran naked through the streets of Syracuse, crying, "I have found it, I have found it," soon subsided into indifference, and he went forward in quest of new discoveries.

When Newton ascertained the laws of universal

gravitation, and Franklin discovered the identity of lightning and the electric fluid, and felt the transport which such discoveries must have excited, did they slack their pace in the road of scientific discovery, or sit down contented with their past researches? No. One discovery gave a stimulus to the pursuit of another, and their career of improvement only terminated with their lives.

But let us ever remember, that all true mental improvement is but the commencement of an everlasting progression, to be prosecuted in a nobler sphere. Then it will be found that all science must terminate in the knowledge of God, and that no human learning is well pursued which does not lead the mind to adore and love its Maker.

For what are all the varied glories of nature, what all the might and mystery of the elements, what all the achievements of the most brilliant intellects, compared with the eternal Jehovah, "who spake, and it was done; who commanded, and it stood fast; who maketh the clouds his chariot, and rideth upon the wings of the wind;" before whom all human mind is feebleness indeed, and the great anthem of the heavenly host,

"A light wave,
That breaks and whispers of its Maker nigh."

II.

The Means of Success.

AN ADDRESS DELIVERED BEFORE THE ENON ACADEMY.

It is said, and generally believed, that *man is a creature of circumstances*, which idea, carried a little further, means that man is an instrument in the hand of Fortune—the child of Destiny—the passive being of blind Chance. To discuss the subject of man's free agency, would, at this time and place, be a futile undertaking; it is a subject on which theologians and philosophers are not agreed, and it is one which finite minds can never fathom. That man is not entirely the creature of circumstances—that he is not impelled, in all cases, by an unseen and irresistible power—common sense and common observation bear daily and most conclusive testimony. He is placed in a sphere where he can yet, as well as in the days of primeval innocence, choose good or evil; many roads lie open before him, any of which he can travel, as fancy or judgment may dictate. Many courses of conduct are left alike to his choice, and he also has the moral power to follow any of the pursuits and avocations of life. That the Almighty directs events over which we have no con-

trol, is most certain; but that he has given to man power to govern his own actions, regulate his own life, and take advantage of many circumstances, is equally certain; else man is not accountable for his acts here, and is but a machine in the hands of his Maker. We have the express declaration of God himself, that he does not willingly grieve or afflict the children of men; and, therefore, when he does defeat them in their well laid schemes of worldly advantage or pleasure, it is for their good. This view of the case, places man in the position in which he ought to stand in relation to his Maker and his fellow-men; his condition in life is thus made to depend upon God for his power to act, and responsible to him for the manner in which he exercises the power given.

In most instances, then, man is the artificer of his own fortune, whether it be good or ill; he is left to enjoy pleasure, or suffer pain, as he adopts one or the other course of conduct; he acquires wealth or enemies, or sinks into poverty and obscurity, as he puts forth his energies, or allows them to lie dormant. It may well be doubted, whether any man is so much under the influence of supernatural agency as not to be able, by an effort of the will, to change circumstances so as to alter the whole tenor of his life. Napoleon believed that he was born to accomplish some great end in the design of the Almighty, and that, therefore, he would fulfill his destiny. But while he was winning his way to such an astonishing height of glory and power, and tasting the delicious cup of gratified ambition, it may not be derogating from the supremacy of Omnipotence to say, that

even Napoleon could have thwarted destiny, and finished his career by a less humiliating death. Was it the prompting of ambition, and ardent desire to leave a successor to his fame and throne, that caused him to divorce his excellent empress? or was it rather, according to his own notion, some undefinable supernatural influence that hurried him on to the accomplishment of his destiny?

The disciples of Mohammed believe themselves to be under the uncontrollable influence of fate. In accordance with this belief, they bear with indifference and equanimity all the vicissitudes of life, and regardless alike of the smiles or frowns of fortune, they are never elated by prosperity or depressed by adversity—never alarmed by sickness, or frightened by the prospect of death. Principles of belief which lead to such practical results, operate as a palsy to the intellect—to the whole man; they are the “frost of the soul,” chilling all its faculties and energies, and benumbing all the propensities which tend to the melioration and improvement of human society. The man who makes “whatever is, is right,” his governing principle, will find little to stimulate him to exertion to promote his own welfare, or that of others around him. Were this principle generally adopted, we might bid adieu to all improvement in arts and sciences, and all the noble enterprises to advance the interests of the human family here, and their happiness hereafter.

If man is not the machine that some creeds and much practice make him to be, if he is not the creature or slave of circumstances, he is then the master of his own actions; and having the ability

to control many circumstances by which he is surrounded, he has, therefore, in his own hands and at his own disposal, to a great extent, his happiness and fortune. In whatever rank of life man is found, he is the same subject of an Almighty Sovereign, whose allegiance he cannot throw off, and upon whom he is dependent for his continued existence, and for whatever power he may have to govern his own actions.

Men, when left to their own disposal, and following the impulse of their own wayward fancy, or the dictates of their better judgment, exhibit different tastes and different faculties, and, therefore, pursue different avocations in life. This diversity of taste and occupation is owing to a dissimilarity in mental character; and although the intellect may, in most men, possess some traits common to all, yet the particular features of the mind are as various as those of the body. Each individual receives the impress of mind by the hand of nature, and this peculiar bent of the mind is neither more nor less than a constitutional temperament or predisposition. This natural predisposition leads one in early life to show a fondness for music, another a faculty for acquiring a knowledge of language, while a third is ambitious of military glory, and another again is desirous of accumulating wealth; and thus the different propensities or faculties are so balanced and blended, that they give a vast variety of shade and coloring to the human character. Those who possess to a great degree this natural taste or predilection for any art, or for any particular department in letters or science, are the geniuses which astonish and delight the

world. Therefore it is that most men are better fitted for one occupation than another; and this is the reason why a man may succeed in one employment, while in another he meets with nothing but failure and disappointment. It is by losing sight of the important fact that all men are not constituted alike, that each individual throws the blame for his want of success on the adversity which befalls him, on some other person or some certain circumstances, not being aware that he has overrated his powers, and that he has taken a course different from that for which nature designed him. The truth of the proposition, that on each individual depends his own welfare, is in no wise shaken by the fact that nature forms him for some particular sphere; he has then but to follow her indications, and his success is rendered doubly certain.

These few introductory remarks, naturally lead us to a more direct consideration of the subject of our lecture—THE MEANS OF SUCCESS.

One of the principal means of success is *a mind illuminated and enriched by knowledge*. This is unquestionably the foundation upon which the great superstructure of success rests. How far the attainment of mental riches depends on original capacity, need not here be discussed. We know that they are largely acquirable. Ordinary minds may become truly opulent by mere dint of study, even amid the pressing labors of life. Nothing can be more false than the common impression that the active world is too active for mental improvement. Men will be under some disadvantage there, it is true. They will be subjected to irregularity, interruption, a

temptation to intellectual idleness, arising from society, from insane money-getting, and envious office-seeking. There will be wanting the guidance of the living teacher, the compulsion of approaching reaction, the stimulus of companionship in study, the movement, and arrangement, and atmosphere, and general régime of a literary institution.

But they will have for their teachers the great dead of past generations. Nature will open to them her mysteries and grandeurs—Religion offer her infinite themes—History will read to them profound experience—the human mind will open its richest philosophy—human life will outspread its practical illustrations of all these treasured lessons. They will also have the benefit of an eliciting collision with fellow intellects. They will see beckoning spheres and duties of life, that demand the highest powers of the human mind. These high teachings, stirring excitements, powerful motives, may keep alive a high intellectual enthusiasm, and assist to noble advancements in knowledge.

Should the education attained amid the activities of life, have less polish, less conformity to classic rules of art, than the cloistered learning of the college, it will have more practical definiteness, more redolence of experience and life, and real availability. Men are not graduating when they leave the academy or college; they are just entering the higher university—the great world! The influence of knowledge, thus acquired both in the study and driving world, cannot be estimated.

Where do we look for the efficient agency that moves and shapes all human things? What drives

the great locomotive of life? What lays out the great web of social affairs? What points out the tracks and tunnels whither improvement shall push its pathway, and industry send its productions? What settles human opinion? defines creeds, political and religious? It is the student intellect of the community abounding in all practical knowledge and philosophy.

Cæsar, buried every day for years in profound studies, to the sagacious citizens of Rome was the foreshadowing of that colossal spirit which afterward stood against the world. See in that studious seclusion the secret of his success. Bid defiance to all inherent mental indolence! Deeply study, intensely invigorate the intellectual faculties. Regard not the old sneer about the smell of the lamp, nor the old cry of imitator, or book-worm. Many studious men, who have heard from contemporaries such ridicule, have afterward risen as noble orbs above all surrounding mind, and seen these same contemporaries revolving around themselves, and begging from them light and heat.

It is not mind alone enriched with knowledge, which constitutes the principal element of success. There is wanted rigid discipline, also. The intellectual powers must be subjected to a protracted and sound drill. There is a vast amount of cultivated understanding which is not at proper command, which acts fitfully, loses golden opportunities, expends large energies upon small accomplishments, hazards great results by stinted appropriations. To avoid these misdirections, wastes and failures, the mental faculties need to be taught implicit obedience.

They need to be trained to act in all emergencies just in the manner, just at the time, and with just the measure of exertion, required of them. They must be ready and accustomed to honor any proper draft, to advocate any valuable interest, to battle against any error, to establish any important truth. They must learn to be expert with any kind of weapons, to reason or illustrate, to investigate or describe, to move irresistibly to the true point of attack, to keep entirely calm and self-possessed in the deepest scenes of conflict.

Human effort of any kind, to be successful, must also be concentrated. Through the journey of life, there will always be a strong temptation to an undirected saunter on all the fields which offer attractions, and in this way the vigor of youth and strength of manhood may be passed, and little or nothing accomplished. Efforts made over a large sphere are successful nowhere. Let us not consider ourselves exceptions to this remark—indeed there are no exceptions; the most powerful minds of this world are no exceptions. No intellect has yet ever existed, save the Infinite Mind, which was truly great in more than one sphere.

Milton, Shakespeare, Bacon and Locke, wrought each but one intellectual miracle, left but one work of immortality, outrivalled all minds but in one transcendent creation. If you would be great, if you would be successful, my young friend, you must direct your mind to one distinct business, one grand enthusiasm. Let your mental efforts resemble a collected storm, poured in one irresistible current through a mountain gorge. If we would build a

tower to reach heaven, while we are in this world, we must concentrate all our labors upon it; we must lay all upon the self-same foundation. A pigmy who carries through life to one spot, will raise a larger monument than the giant who begins a new mound every year. Set up one grand engrossing object, attempt one service, then fill up life with mighty exertions; strike heavy blows, draw a powerful bow, and the arrow will be propelled to its destined point. Let me advise you, then, to concentration—to mental concentration concentrated. You will find it one of the great secrets of success.

Another important element of success is *self-reliance*. Every man has his own sphere, his own duties, and his own powers to discharge them. This place no other man is to take; his labors no other is to perform. This is the natural order; this is the divine arrangement; every departure from it is a loss; every pound weight placed upon crutches, diminishes muscular ability to walk alone; the less one borrows, the more he will have himself; the more he rests upon his own basis, the more firm will it become underneath him, like the stones for foundation, which grow more immovable as the augmenting superstructure presses upon them more heavily; he that has little self-reliance will soon have little to rely on; he that undertakes himself, whatever his hands findeth to do, will soon find his abilities commensurate to the most noble achievements.

These suggestions, which are true of all our attributes, are emphatically true of all our intellectual faculties. A self-relying journey on foot over a few degrees, will enrich one with more of the power of

truth than the traverse of a hemisphere in luxurious conveyances. If a man would acquire might of intellect, let him take this independent mode of travel through all the fields of knowledge. It has already been intimated that literary aids and teachers are by no means to be abjured. Let us go to all the great masters of thought, and to all the wisdom which past ages have wisely treasured; of the works of the present time, let us read all those which stand as the indices and prototypes of our age. But let us turn to them, as we would survey a garden or a park—not to thrust the lawns, and fountains, and trees, into our pockets, but to catch outlines, to familiarize projections, to warm our love of beauty, to awake inspirations, to harmonize the spirit within with the glorious spirit of nature without. Let us apply to all the fountains of knowledge, not to fill a reservoir, but simply to water the plants growing on our own spirit. We may for a while appear a little brighter by means of borrowed light, but it will soon become dim!

Self-dependence creates and works a deep soil, which sends up an inexhaustible luxuriance; dependence makes a garden of exotics set in boxes and vases, of little beauty, or fruit, or life, away from their own native soil or air. Plant, then, your own crops, and reap your own fields, and you will enjoy the sweet fruition of your own labors.

Moral integrity is also an important element of success. Purity is the largest element of that omnipotence which invests the Supreme Deity. Equal is its importance and rank in the character of man. When nearest the Deity in excellence, is he nearest

the Deity in power. It is not necessary that we consider, or even know the reason that moral goodness gives men sway. It is only necessary that we settle it with ourselves as a practical truth, never for one moment to be forgotten or disregarded, that God has been pleased to constitute goodness his own and man's great agent of influence, uniformly and universally. Men are so constituted by the hand of the Almighty, as to bow down to moral goodness and do it honor.

Let there be within us an ever-throbbing, strong conscientiousness. Let it purify our character; let it govern every action of our lives. Then we shall have one devoted advocate and friend in every man who may be within our sphere; one conscientious conscience issuing from the entire humanity in the midst of which we move, testifying in our behalf, vouching for our worth and our truth. With such an advocacy and such an awakened confidence, the power of cultivated mind becomes immense; commensurate, indeed, to everything which God wishes man to do while he remains a probationer in this world.

Endowed with the indwelling of high moral sentiments, and intellectual faculties and sensibilities all subordinated, man will sink and disappear in no narrow factions, religious or political. He will be identified with the great party of righteousness, with the supreme interests of the human race. It has been by walking in such sphere of man's being, by possessing a purer inner life than the multitude, that the revered dead whom we specially honor, became mighty on the earth. They who like them

preserve a great, rich heart, giving nutrition to all their powers, and like them stand clean and clear in every office, shall open abroad influences as bland and blessed as they can desire to leave upon their generation. Almost at will they shall be able to turn the vital currents of thousands into one current, and their opposing multitudinous opinions into one tide. In the addresses of him who cometh to men with a character sound to the core, data appear more legitimate, argumentation more logical, conclusions more conclusive—truth on his lips seems more divine, injunction more imperious, appeal more mighty. The understanding may be vigorous, erudition profound, memory a library; but the warm soul of purity wanting, he who would carry us captive, is no more than one that hath a pleasant voice and can play well upon an instrument. Would a man be successful in any of the learned professions? Would he gain wealth and the laurels of a world's benediction? Then must he be transcendently good and pure.

Earnestness is the last element of success that we shall notice at this time. This attribute of character assists in constructing and furnishing the mind with power for efficient action. Dullness and stupidity, at the guiding and bidding of intelligence, may turn a wheel, drill a rock, sink a well, pull an oar. So may a machine—but to rise above a machine, to gather up massive learning and ability capable of acting on the character and achievements of the race, is no more to be expected without an ardent living enthusiasm, than is the growth of the gigantic oak without circulating juices through the

heart of it. When a kiln-dried root is seen evolving into a luxuriant tree, then a mass of passionless stupidity may be witnessed growing into a richly finished scholar and man for the influential duties of life. There must be in every man, in order to his expansion into an energetic, accomplishing agent, an ever-stirring and gushing tide of life.

Earnestness has a great importance in giving effectiveness after the man is constructed. It thoroughly awakes, it arouses to action, it vitalizes and invigorates. Men generally have a vast treasury of interior powers not brought into play. This is shown by the amazing endurances and accomplishments of men under pressing exigencies. The materials were always lying within them; there was needed only an excitement, a passion, an electric spark. There lie great ideas yet unawakened, capable in the sweep of their power of changing half the globe. An earnest spirit is the thrilling animation fitted to give them birth. It puts the whole being into life, motion, effort and accomplishment.

We love to see an *earnest man*. He is the personification of an acting enthusiasm—he is an embodiment of a living, breathing, moving, accomplishing excitability. Such a bundle of earnestness, therefore, from man's very constitution, will turn all eyes upon it. Whatever else may be passed by on the other side, the earnest man will never be turned from. It is not that he is peculiar, or great, or invested with office; it is that he is earnest. The wide-awake man is a fire; all points of the compass blow toward him. Earnestness is contagious, that

as in nature, so in morals and learning, loves radiation. Nothing belonging to conduct and character so spontaneously communicates itself, and reappears and spreads, as this thorough intense-ness — like a prairie conflagration, it leaps and kindles, and leaps and kindles, again and again, until it finds its way to all the combustible material within its reach.

The earnest man, as a self-moving machine, not waiting for external fires and winds to propel him, becomes a specially impressive agency. The warm, right onward men, have a life, breath, light, movement, strength, sincerity and aggressiveness, which make them the grand remodelers of their age. They raise the standard! They pioneer advancement! They are at the head of every great and noble cause which has for its object the moral and intellectual elevation of the race.

Such, my young friends, are some of the mental attributes which you must possess, if you would raise to honor and distinction in the world. They will place you in a commanding position among your fellows; they will invest you with a power almost superhuman. Let me exhort you, then, in conclusion, to consecrate all your powers, both of body and mind, to the good of man and the glory of God; this will secure you the most permanent happiness while you thread the mazes of life—it will give you victory in the hour of death—and immortality and eternal life in the world to come.

III.

Our Republican Institutions:

EDUCATION NECESSARY FOR THEIR PERPETUITY.

THE subjects that claim the attention and investigation of mankind, are numerous and varied. They embrace a circle which is continually enlarging and becoming more and more interesting and captivating to the mind. In this grand circle all may find some occupation, some object suited to their taste and capacities. Here the humblest child may tread with as free a step as the most profound philosopher. All may enter Wisdom's temple, drink from her sparkling fount, and dine at her sumptuous board.

Among the various subjects which are worthy of investigation, none occupy a more important place than the political history of our race. Few things are of more importance. It is not confined within the narrow limits of two or three centuries, but extends over the whole of the past. It presents man in every variety of situation. Now we behold him in the possession of all his noble rights, his prerogatives acknowledged, and his freedom understood. Then we see him crouching like a subdued

animal, before his oppressor, drinking the bitter cup of slavery, and denied the invaluable blessings that give to the present all its cheerfulness, and to the future all its hopes. At one time we view him crushed beneath the triumphal car of ambition; at another, shut up in the gloom of the dungeon, and breathing upon its walls the faint prayer of liberty; at another, blest with the restoration of his natural privileges, and reposing in the shade of his own "vine and fig-tree."

In all these conditions, there is something to please and improve us. Whatever be our station or character, we shall there gather something to enlighten our understandings and elevate our minds. If we be Christians, we shall, in pursuing the political history of man, discover the constant workings of that Providence, which never for a moment abandons the earth—that Providence which has been unceasingly employed in bringing light out of darkness, and joy out of sorrow. If we be politicians, we shall here meet with much to expand our knowledge, and be enabled to see the operations of those systems under which man has lived.

The progress of man toward political perfection has been slow and unsteady. Everything in this world bears the stamp of imperfection. It appeals to our observation on every side. Particularly does the observation apply to the science of government. Through how many ages were false ideas entertained on this subject? For what a space of time were the rights of the governor and the governed misunderstood; and how painful is the conviction, that for centuries our race endured multiplied hor-

rors on this account? Happily for humanity, a brighter day has dawned. The pillars of oppression have fallen in different countries—the scepter of tyranny has been broken and buried in the dust—the chains that were once worn by a bleeding people, have been shaken off by the power of innocence and justice. The present century finds man, in his political character, an improved being, standing upon an eminence which it required ages of toil and efforts of perseverance to reach.

The establishment of American institutions formed an era in the political history of man. It turned the tide of events, and directed it in a new channel. Though a solitary occurrence in itself, it has probably done more for our race than anything of a like character.

Everything that could have conspired to give this event importance and notoriety, did conspire to produce this effect. Previous and attendant circumstances united to call universal attention to it, and spread its powerful leaven through the entire mass of society. Who was the foe? Was it an obscure and feeble nation, enervated by corruption, without courage and determination? Was it such a nation? No. American resistance was directed against the mightiest people on the globe. England, whose arm had never known weakness—whose brow was covered with laurels gathered on her numerous battle fields—England, with a strong navy, a celebrated army—she was our enemy. And what were we? Small in our population, limited in our resources, undisciplined and unprepared. Such a contest was calculated to excite observation and sympathy.

No period could be more fortunate for such an event, than the one at which it occurred. Providence always seems to have an eye to time, and especially in this instance does it appear to have been considered. Had it taken place earlier or later, its glorious results would have been partially counteracted. Happening at the time it did, when the public mind and feeling were in a ripened state, it made a firm grasp on public opinion, and entwined itself more closely around the sympathies of our race.

Whatever modifications of a popular government had existed before, there had never been framed such a political system. The materials, it is true, were found before; principles of a similar character had been professed on the other side of the Atlantic, by a few, but they had never been combined into such a form. The temple of liberty which our fathers raised on the soil of the western hemisphere—whose foundation was laid in nature, and whose walls were cemented by their own blood—was built upon a model entirely new.

It was at that time that the great battle of human rights and liberty was to be fought. Then tyranny and freedom were to decide their strength and merits. America, the theater of action—the world, the spectators. Oppression, on the one side, drew up its formidable legions, trained to its service, and accustomed to defend its usurpations. Justice, on the other hand, ranged her champions. They were few but faithful; there was nerve in their arms and righteousness their cause. She told them of their outraged rights—she pointed to the wounds

they had received, and urged them to the meeting. And what are the consequences? See them in the happiness we now enjoy—see them in the radiant hopes that illuminate the future; and again, see them in the conduct of other nations, who have imitated our example, and attained the same invaluable prize. Consequences that gladden the warm bosom of every true patriot, and increase the praises that rise from earthly altars to the throne of God.

Could the founders of our republic have been assured of the brilliant success that awaited their scheme, could they have been permitted to gaze on the sealed pages of futurity's volume, and read the glorious destiny that Providence had ordered for them, with what new vigor would they have been inspired. Over the cloud of war, the rainbow of hope would have ever bent. Despondency would have never unnerved their arm. With an un murmuring tongue, they would have endured every ill; with an undaunted step, they would have proceeded on their shining path of honor. However firm they might have been persuaded of the integrity of their cause, they could not have flattered themselves with expectations of such a victory. Little did they think, that half a century could have made such astonishing revolutions.

And what has been the cause of this unexampled success? What is it in our constitution, that has secured so much prosperity? Why has our eagle soared so high? The secret of our triumph is to be found in the fact, that ours is a liberal government—in their political rights, all men are equal. It is this equality of rights that forms the distinctive fea-

ture of our policy. This has surrounded our country with so many attractions—this has made it so satisfactory to ourselves.

Where is a man so likely to be satisfied, as in a country which acknowledges his rank and respects his character? Where is he better pleased, than in that land which throws around him its protecting arms and secures to him peace and happiness? So is it here. All are placed on the same footing. The proud distinctions of aristocracy are unknown—each one, through the agency of his representatives, may take a part in framing the laws and establishing those regulations, under which he is to live. In the law, every man has a safeguard; it protects and defends him. If injustice dare place its iron hand upon him, if his rights be infringed, if his peace be disturbed, he has a refuge whither he may flee and obtain full redress. Who will say that such a state of society is not desirable? How well designed is it to allay that feverish excitement which so often pervades a community, and to destroy those cancerous qualities that feed upon its tranquility and pleasure.

Experience has verified that this kind of government is favorable to all the interests of man. Under it, Christianity may flourish “like a tree planted by the rivers of water,” disseminating through all its borders its healthful influence, repressing all unholy emotions, and teaching men to dwell together in love and harmony. Under it, literature and the arts may advance, and diffuse their blessings on every side. What is there connected with man that does not here find a soil in which to grow? We ask

nothing more for our country than she deserves. Let her enemies taunt her—let the advocates of royalty despise her. The history of the past is her eulogy—the hope of her future is her glory. That our excellent government should be sustained, is perhaps acknowledged by all present. It will not, therefore, be necessary to enter into an argument to convince you that important ends will be accomplished by a continuation of our institutions. All that any of us can be presumed to need, is to have our minds excited to a grateful remembrance of the things connected with our national character and happiness.

And what is it, I would ask, that can shield our nation from injury, and guide its footsteps to imperishable glory? EDUCATION. And by this, I do not simply mean instructing a child in the common branches of an English education. I use this word in its most extreme sense. By it, I mean the training of the whole individual, in reference to an object; or, in other words, so physically, intellectually and morally improved, as to be qualified for any post of honor and profit in this life, and for the highest enjoyment of which man is capable in the world to come.

The instrumentalities employed in the education of mankind are so numerous, that it would be impossible in an address of this kind to notice them all. We will, therefore, confine the remainder of our remarks to the objects sought to be obtained by general education. And I would here observe, that the physical nature of every human being in infancy, is a man in miniature: and when enlarged to the

stature of a man, without physical improvement and intellectual culture, is an overgrown child. His intellectual proportions correspond in the morning of his life with his physical; and may or may not grow with his growth and strengthen with his strength, as he may or may not be educated. Many a man, advanced in years, a giant in stature, is a mere intellectual pigmy. Nor is it to be supposed that the moral powers of our nature are stronger in our infancy than the other components of our being, or that they naturally ripen without cultivation, or are miraculously matured. The moral obliquities of men are to be accounted for in the same way that we ascertain the causes of their intellectual blunders—it is the want of education.

The wise man has said, "Train up a child in the way he should go, and when he is old he will not depart from it"—at least not for the want of ability to walk therein. Why was it that the soldiers of Sparta were so invincible? They were drilled under the operation of the laws of Lycurgus—they were educated for war—were trained to luxuriate in the conflicts of the field. Why did Rome conquer the world? One reason at least was, that by discipline she became an army of soldiers. How was it that Newton became a prodigy in the science of astronomy? Was it because nature made him one? No. He labored hard, and trained himself in view of the elevation to which he ultimately attained. And so must we. The midnight lamp must be trimmed—the sluggard must awake from his sleep, and diligently seek for the pearl of great price.

But what should be the nature of that system of

education which is to perpetuate our political liberty? We would answer in the first place, that it should be *general*—that it should embrace every individual in the land. Nothing could be more evident than that to whatever business a man intends to devote himself, or to whatever calling a parent may decide to devote his child, a portion of his education should be general. This is the foundation that must be laid, on which the superstructure is to be reared in every community claiming to be acknowledged an enlightened people. It will follow, then, that the means should be adapted to the end—that the education which is to bear up the high and mighty arch of our government should look to the object to be accomplished. The cultivation indispensable to good citizenship is general. It should not only have respect to the whole subject, but to every subject, and embrace everything in its range that will strengthen the body, form habits of industry and frugality, and will enlighten the mind, rendering it capable of enlarged views in any conceivable position it may occupy in society.

Again, we would remark that the education necessary to the perpetuity of our political liberty, should be *particular*. By this, we mean that the whole system or process, whether national or private, from the moment the affectionate mother imparts the earliest lessons to the period when the subject enters upon the theater of life, fully qualified for the duties and responsibilities of a citizen of these United States, should be employed in view of the relations we all sustain to our country. Hence, independent of reading, writing, arithmetic, grammar

and geography, history and political economy should be regarded as essential to the education of our youth. The former will reveal the causes of the rise and fall of empires and republics, with the comparative advantages and disadvantages of each—the close connection there always has been between knowledge and freedom, and the importance of ignorance in the people to the stability of absolute monarchy. Every member of a free republic should read history. In a nation where popular opinion must be the supreme arbiter, of what immense importance is it that that opinion should be corrected by wisdom and experience; otherwise the political vessel will wander wide upon tempestuous seas, and be lost among the rocks and whirlpools of contending factions.

The science of government is seldom, if ever, taught in our common schools. The nature of those glorious institutions under which we live, and the philosophy on which they are founded, should be fully understood by every American citizen, before he is permitted to exercise the elective franchise. What is it, I would ask, in which the people of the United States consider themselves privileged, far above every other people, and to gain which a majority of all who dwell in Europe would gladly risk their lives? I know not what it is, unless it be the right of choosing rulers from among equals. Yet, through this, which is not only a good thing politically, but the best political thing that can be, this country seems to be poising at times on the very brink of destruction. Individuals are frequently elevated to offices of trust and honor, who know

but little about the principles of our government, and the means to be employed to secure its peace and prosperity. How could it be otherwise? We go on from generation to generation, as though a clear knowledge of the rights of a free citizen could be had throughout our extensive country by some sort of inspiration. We all know, every citizen is presumed to judge of public policy, and to be able, if it be wicked or unwise, to correct it, by exercising his electoral rights. Yet there is not one youth in a thousand, even amongst the best educated, who ever spent an hour in studying the principles of our political and social being. It will not be denied, that nearly all our children pass from minority into citizenship and all its serious duties, without one word of instruction as to the nature of those duties, nor even that there are any such duties. If a youth observes at all what is passing in the political world, he only reads some speech, as a specimen of eloquence, or notices some electioneering controversy, which must seem to him to be of much the same dignity of a combat among gladiators; and if the election involve some principle of constitutional law, or of vital expediency, these lie far beyond his comprehension. How should he have learned that on the conscientious exercise of electoral rights depends the welfare of himself, of all around him, and of all who are to come after him? It never entered into his head that a sacred trust will soon devolve upon him, for which he will be held far more seriously accountable than he can be for any other trust which it may be in his power to assume. See to it, then, ye friends of education and liberty,

that our youth be thoroughly trained in those great and glorious principles of republicanism for which our fathers bled and died, that they may do their duty faithfully to themselves and to coming generations.

Again, all our educational plans will be of little use if there be no teaching in morals and in the rational belief on which such morals rest; for learning which is not chastened by such teaching, is more likely to be mischievous than useful. There never was a time in the history of our nation, which demanded so much integrity and righteousness in our rulers as the present. Grave and important questions are constantly arising, which can only be decided by the Higher Law. There are questions now before this country for decision, which will affect the destinies of unborn millions of men. Let our children be educated in those principles of morality which our Saviour taught and exemplified in his holy life, and I fear not the result.

If, then, by the use of all those instrumentalities perfectly within our reach, this triumphant and happy republic shall be "a republic of letters," its permanency may not be doubted, though every other portion of the globe be shaken by political commotions. The advancement of our learning will contribute to our permanency, and our influence will be favorably felt abroad. While on the one hand the success of the experiment at self government, and the happiness resulting, will excite the people of other nations to demand similar rights of their rulers, the diverging light which is now taking the wings of the morning and flying to the uttermost

parts of the earth, will reveal to the holders of power the necessity of yielding to the popular voice. As such events transpire, increasing power will be given to the instrumentalities by which the political and moral regeneration of the world shall take place. Thus shall the period arrive, long foretold by the prophets, when "wars shall cease to the end of the earth," and vice and immorality shall be done away. What a desirable state of things! Especially as the means to effect it are those that will not fail to add to our national glory and stability.

Let education, then, become co-extensive with our increasing population, and those waters which gush from the hill of science in a thousand rippling streams, be distributed through the length and breadth of the land, and the most luxuriant fertility will result. There will not then be—thinly scattered—a few brilliant stars, serving only to reveal the darkness of their day and generation, but the entire republican arch will be lighted up with millions, all radiant with luster, which shall at once constitute the glory and safety of the land.

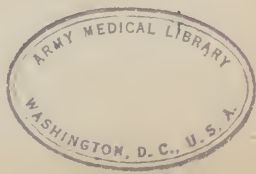
Thus will the banner of liberty, now waving over the nursery of equal rights, continue to float on every gentle breeze as it passes, until the angel which shall proclaim the end of time, shall announce that the only bright standard, the standard of the Cross, is planted on the last verge of a world made free by the Son of God.

IV.

Progress, Education and Physiology.

THE subject of education is one of transcendent importance, and is worthy the earnest attention of every free and intelligent community. There is no subject that has occupied so large a share of the interest of the wise and the good of all enlightened nations; and yet there is no one so little understood. It is a fact that cannot be controverted, that the social and moral progress of man has not kept pace with his advancement in the arts and sciences. Human ingenuity and skill have been exerted to their utmost in bringing these to perfection; and look at the glorious results.

The canvas and the marble speak to us in all the touching passions of humanity. We gaze on the almost speaking marble, and feel the fluctuation of the varied passions, as they usurp the control of our emotions. The canvas sends forth lessons of all that can purify the heart and instruct the mind; it perpetuates the memory of those we love, and transmits to posterity the good and evil deeds of former times; with a power peculiar to itself, it embodies the creations of the ideal world, and presents to the beholder the all but living impress of



humanity. Poetry and music! emanating from the finer feelings of our nature, charm us with their exalted sentiment and heavenly harmony.

The earth is full of labor saving machines, of most curious construction and power, that daily perform the work of millions of hands—and they are multiplying to an almost indefinite extent. Rail roads radiate to every point of the compass. Steam boats, with their untiring wheels, plow deep into all our navigable streams; and ere long the whole globe will be traversed by steam boats and locomotives, connecting land and sea to their remotest bounds.

Science, eagle-like, has soared above the clouds, and seized the lightning by its flaming tongue, compelling it to become a machine of thought between man and man. Wonderful! to compel that fierce power to utter friendly words, that is born of the ravening elements, that goes with a leap and a shout on its mission of destruction and death, tearing the gigantic oak as if it were a toy, and rending the bosom of the everlasting hills!

But while science has done so much, has forced the clouds, winds, waves, and all the elements of nature, to do her bidding, why has our social and moral advancement been so slow? Is it the fault of our Creator? Has he been parsimonious in the bestowment of moral and social qualities to the race? Nay! God has imparted to them the same elements of progress with the intellectual, and vastly more. But where shall we look for the cause of this wrong? Many, in reasoning upon this subject, have traced it back to the garden of Eden, and the ruin that was there wrought in the moral nature of

man, by the fall of his first parents. I have no disposition to controvert so obvious a proposition as the natural depravity of the human heart, for we all know by sad experience, "that it is deceitful above all things, and desperately wicked." Yet I think this is not the chief and only cause of the wrong.

If I do not err, very much of it may be laid 'to our moral instructors. The great mass of them have not "come up to the help of the Lord against the mighty," as they should have done. They have remained inert, have covered themselves with the learned dust of ages, and rested like an incubus upon the intellectual and moral progress of the race. In very many instances, they have perverted the most exalted attribute of their nature by *deifying* man, by embracing principles opposed to advancement as incontrovertible truths—many of which were adapted for the government of a barbarous people—and adhered to them with a spirit as indomitable as if there were no law of progression, written all over the works of God, on each atom of our globe, and in burning, shining characters on the vast system of worlds filling immensity, and how much more distinctly on mind, for which all matter was made. Progress! is the watch-word. Progress is Nature's eternal law; and all her forests, mountains, and seas, respond to it in one universal anthem.

We feel sad when we contemplate the conservatism just alluded to. Its tendency is to barbarism, its spirit is opposed to an enlightened age and Christianity. But we can no longer marvel that our social and moral progress has been so slow, when

there has been so strong an inclination among our leaders to go back, instead of forward, for light—to pore over musty tomes, and perplex themselves with undecipherable hieroglyphics, when the fair book of nature lay spread out before them. But while they have been thus engaged, and in disputing about the letter of the law, the people have been catching a portion of its spirit, and are no longer willing to be kept in bondage to antiquated dogmas.

The above remarks apply with particular force to the subject of education. This is evinced by the liberal patronage bestowed on all institutions for the advancement of human intellect; in the increasing numbers of our schools and seminaries of learning; in the various improvements that have superseded former modes of instruction, and in the concentrated efforts of many minds for the purpose of still further promoting the cause of education. It is also evinced in the formation and support of institutes like the one I have the pleasure of addressing on the present occasion; composed of enlightened and liberal minds, animated with a desire of promoting the interest of sound learning, and convened to deliberate on the best means of effecting its important object.

The contemplation of such facts and scenes, must rejoice the heart of every true friend of man. It must fill his mind with bright hopes and glorious expectations for the future. No lover of our republican institutions can regard these tokens of progress with indifference. The cause of national liberty and sound morals, and the cause of education, have one common bond of union. They must stand or

fall together. It is only by promoting the latter, that we can lay the foundations of our happy institutions broad and deep, and erect a superstructure of enduring strength.

But as a physician, Mr. President, I rejoice with fear and trembling; for I see much in this rapid progress to excite alarm, as well as to animate hope. At a period like the present, when the cause of education has taken such a hold upon the mind, and literary excellence has become one of the chief desiderata, I feel it to be particularly necessary that its dangers as well as its blessings should be accurately pointed out. Otherwise, the good work thus auspiciously begun, may be seriously retarded, and the bright hopes it has excited may end in disappointment.

It is well known, that deranged health is one of the common consequences of a studious life. The history of literature, in all ages, presents melancholy instances of superior minds over which the grave has prematurely closed; of genius formed to take long and adventurous flights, and talent whose bright beginnings gave the promise of enduring fame, suddenly extinguished. Nor do our times, with all their boasted improvements, fail to swell out the melancholy list. The path of science is still beset with dangers. The pallid look, the dull eye, the weary gait, and the emaciated forms of many of our most promising youth, cannot have escaped the notice of every careful observer, nor failed to excite the apprehensions of every faithful parent and teacher.

These facts show too plainly that all is not yet right;

that our modes of education are not yet perfected, that the reform is not completed; that there is still some rubbish of the departed system to be cleared away, and much in our imagined advancement that does not deserve the name. They mingle too many apprehensions with the high hopes that spring up in the mind, when it surveys the improvements of the day; and they should excite us to a more diligent inspection of the various causes that lie at the foundation of these dangers.

A double diligence is necessary at this time, since the very improvements in education over which we rejoice, have kindled a spirit, which, to a certain class of minds, and that the best class, is full of danger. They have multiplied the means of supplying a literary thirst, and multiplied, at the same time, the temptations to sacrifice health and strength to the desire of cultivating the mind.

Far be it from us to say anything to repress this desire, where it does not exceed its proper bounds. We are not among those who believe that ill health is a necessary consequence of study. The frequent failures that come under our observation, especially among the young, are to be attributed to many other causes. It is the unfavorable circumstances under which study is performed. It is crowded rooms, improper hours, transgressing upon the period of sleep, positions unfavorable to the freedom of the corporeal functions, improper diet, excessive action of some organs, with unnatural repose of others. It is overlooking the peculiarities of the system, dependent upon various ages and different temperaments, tasking the mind with excessive

duties, or at unfit times. It is a spirit of competition, wholly unworthy the true lover of learning; an unholy competition, that should be repressed rather than encouraged; a competition that protracts the labor of the mind, long after the changed countenance has uttered the warning voice that nature demands repose.

A more serious attention to this subject is forced upon us at the present time, by many melancholy facts. Its importance has been painfully engraven on my memory, by my medical experience during the last ten years. I have witnessed several instances of disease too evidently the result of overaction of the mind in early life. It was my painful duty, not very long since, to attend a young lady who fell a victim to disease of the brain, by an undue use of the mind in the course of her studies. She was an individual of rare promise. Nature had given her a physical form of unusual beauty; her step was light as that of a fairy queen; her carriage graceful as the movements of Venus; her smiles as benignant as the blushes of Aurora. If her figure was beauty personified, her intellectual faculties were as sparkling gems set in a golden coronet. In these constituted her chief excellence. Here the Graces loved to meet and hold sweet converse, and to the invocations of her soul the Muses lent their open ears. At her call they came entranced, and caught new strains from her bewitching lyre. Intelligence beamed from her eyes in all the effulgence of mind itself; while the sweetness of her disposition, joined with the most perfect amiability of character, caused her to be admired and loved by all who enjoyed her

society. And dark was the day when we laid her beautiful form in the grave.

I remember three young men who died from the same cause, all within a few days of each other. And I am quite satisfied from what I have seen, that these cases are more numerous than is commonly supposed. They clearly show that, in an ardent ambition, on the part of the youth, their parents or teachers, to cultivate the mind, the body has been too much overlooked. This should not be. Parents and teachers should investigate more fully those laws which pertain to man as a physical being, and apply them more directly to all our systems of education.

But I think I hear some one say, "I cannot believe that a knowledge of physiology or the laws of life, can be of any use to any individual excepting those who practice the healing art." This, my young friend, is a great mistake. And if you will have a little patience with me, I will try and state a few reasons why every person ought to be intimately acquainted with the science of physiology.

The inferior animals, you are aware, in their natural state, obey the laws of life by the promptings of instinct, consequently they enjoy uninterrupted health. But man is not governed by instinct. He was created a rational and intelligent being. His Maker, in the exercise of his creative wisdom, has seen fit to commit to him the care of his own body; on him depends, in a great measure, his own happiness or misery. As a free agent, he becomes, to a certain extent, the author of all his sufferings; and indeed, pain is merely the penalty attached to cer-

tain fixed and immutable laws. Now if mankind were fated to transgress these laws, we would acknowledge that it would be useless for them to study or understand them. But man is capable of violating or obeying them, and he should by all means know them; for it is not reasonable to suppose that he will be guided by principles of which he is entirely ignorant. As well might we expect to see the untutored savage guiding safely his little bark amidst storms on the broad and trackless ocean, according to the rules of navigation, of which he never heard or even conceived the remotest idea.

But what is the consequence of ignorance and neglect of the laws of life? No language can portray the sad waste of life in consequence of violated law. Who has not heard the bitter expression of deep-felt anguish of some fond mother, returning from the tomb of a beautiful and once lovely daughter? Who has not seen the manly sternness of a father melted into grief and sorrow, as he beheld the last traces of his own reflected image fade away in the pallid countenance of his dying son? And must such scenes transpire to crush in death the fair promises of youth, and blight the long cherished hopes of affection? We hesitate not to say that such will be the case as long as such ignorance prevails in relation to some of the simplest laws of our physical being.

But premature death is not the only sad consequence. Innumerable pains and woes afflict mankind, which render life almost insupportable; and man, in his efforts to gain relief, ignorant of his own organization, becomes the dupe of unprincipled

charlatans, who, like so many vipers, poison the fountain of life by their vile nostrums. To remove these loathsome pests from society, the complete nature of the human system must be understood. The legislatures may enact laws—scientific physicians may form medical societies and adopt judicious rules, yet as long as such ignorance prevails in relation to this science, society will be cursed with hordes of impostors and mountebanks.

The want of physiological knowledge may also be seen by some of the abuses of society, particularly upon the female portion. The mania that exists for precocious education and marriage, causes the years that nature designed for corporeal development and intellectual vigor, to be wasted in the restraints of dress, the school, and the ball room; with a body half clothed, and a mind intent on frivolous amusement, the hours designed for sleep are perverted by the midnight revel: and here commences, by the constant excitement of the nervous system, that early predominance of that part of her organization that unfits woman, in our climate, for subsequent physical or intellectual effort; sad, indeed, are the effects on her children. The compression of her lungs, by the barbarous corset, has prevented the exercise indispensable to the attainment of organic strength; while the constant excitement of her nerves by alternations of excessive action and exhaustion, with all the morbid physical and moral stimuli inseparable from such a scene—we say, all these powerful co-operations, with an original defective organism inherited from parents who have prostrated their energies by similar excesses, are

abundantly sufficient to account for the early decay of American women, and call loudly for a more general dissemination of a knowledge of physiology, and a more rigid enforcement of its teachings upon the young and rising race.

Again, the importance of a knowledge of physiology will be seen by referring to the intimate connection which exists between the body and the mind. Of the manner in which they are united we know nothing. This much, however, we do know, that the mind in this world depends upon the brain and other parts of the body for its existence and manifestation, and it is only through them that it can act. Let us notice for a moment their influence upon each other. They are the subject of constant observation. We behold them daily in the strong play of the passions. Observe the stormy circulation, the convulsive muscular motion, the foaming mouth, and the glancing eye, so instantaneously produced by a fit of anger. Grief makes its insidious entrance to the very citadel of life, and weakens its forces, one after another, until by slow degrees they lie prostrated before its paralyzing energies. Extreme joy may destroy life. The passion of fear diminishes the action of the heart, empties the blood vessels of the skin, and robs the muscular system of all its powers. The most trifling derangement of any of the organs of the body sometimes generates a moping melancholy, or delirium, that endures through life.

The mental operations are also constantly modified by the varying conditions of the body—by hunger and thirst—by immoderate nourishment—even by the slightest change in the air. The energies of

the stomach are suspended by intense application of the mind. How is the memory impaired, the judgment weakened, and the imagination diseased, by the slightest disorder of the digestive organs? The experience of every observer has taught him that the judgment is less clear after a full meal than before. The various temperaments of the body exert a powerful influence upon the temper and disposition of every individual.

We might cite other examples to illustrate and show the close and wonderful union between the body and the mind, but those which we have mentioned are amply sufficient to establish this fundamental principle of our being, namely: *that the great and astonishing achievements which the mind of man is capable of accomplishing, depends upon the perfection of his bodily organization.* If, therefore, man will ascend the proud eminence which God has placed within his reach, his mental powers must not be impeded by an imperfect instrument. In vain can the mind exert its powers and produce effects worthy of its high destiny, while using a defective, diseased and badly organized body. As well might a chemist attempt to reveal the hidden laws of nature, in brilliant and successful experiments, by a rude and imperfect apparatus, in an ill-constructed laboratory.

How important, then, that the parent and teacher should understand the structure and physiology of the human system, that they may so educate the rising race, that their bodies may not trammel the mind in its operation. A sound and healthy body is one of the greatest blessings heaven has vouchsafed to man; and it can only be preserved by a

rigid and faithful obedience to the law of his physical being, for nature is jealous of her rights, and inflicts merited chastisement on the presumptuous invader of her laws.

But aside from all the direct practical bearings which a knowledge of physiology has on mankind, it constitutes the most interesting matter of study among the natural sciences. The human body is a subject of deep and intense interest. Why penetrate the bowels of the earth, to behold and admire specimens of nature and study her laws? Why soar away to the remotest bounds of space, in search of exhibitions of the wisdom, goodness and power of the Deity, when we behold in the human system a concentration of all that is beautiful, complicated and wonderful in the kingdom of nature?

And who, allow me to ask, can contemplate these wonders without admiration and delight? Behold its exquisite machinery! The perfect structure of its parts! Consider, for a moment, what an immense number of parts must be in action to enable us to breathe, to feel, and to walk. Hundreds of bones, in diversified forms, connected together by various modes of articulation; hundreds of muscles to produce motion; hundreds of tendons and ligaments to connect the bones and muscles; hundreds of arteries to convey blood to the remotest parts of the system; hundreds of veins to bring it back to the heart; thousands of lacteals and lymphatic tubes, absorbing and conveying nutriment to the circulating fluids; infinity of nervous ramifications, diffusing sensation through all parts of this exquisite machinery; and the heart, that complicated organ, "the first to live

and the last to die," exerting a force at every pulsation equal to a hundred thousand pounds, in order to preserve all this intricate machinery in constant operation.

Well may the Psalmist exclaim, "How precious are thy contrivances concerning me, O God! How great is the sum of them. I will praise thee, for I am fearfully and wonderfully made." And allow me to say in conclusion, that I know of no subject in the whole range of science so well adapted to strengthen the mind, expand the intellect, elevate the soul, and lead it through nature up to nature's God, as the study of physiology.

Let it, then, have a place in all our systems of learning; let the laws which govern man's physical constitution be the great foundation on which our educational superstructure is reared. Then will man's whole nature be cultivated,—physical, moral and intellectual. Then will he be fitted for any post of honor and profit in this life, and for the highest and most exalted enjoyment of which he is capable, in the world to come.

V.

Physical & Mental Characteristics of Man.

IF we examine the bodies of some of the inferior animals, we will find that they are composed of bones, muscles, blood-vessels, glands, lungs, digestive organs, brain, organs of sense, and movable limbs, similar, or nearly so, to those of man. In these particulars, we are so nearly allied, that if we were to be judged by a superficial view of our bodily structure alone, the brute and the man would be thought to differ more in figure than in nature. But if more minutely compared, the human frame is found to have some characteristics which gives man, even exclusive of his mental superiority, a pre-eminence, which no class of animals can rival, imitate or acquire. Of these we will particularize a few, which we consider sufficient to confer on our species the power of subduing, transcending, and governing every other class and kingdom of terrestrial nature.

THE ERECT STATURE OF MAN.

The first, and by no means unimportant difference that we would notice, is his upright stature. All other animals are so framed in their bodily construction, as not to possess this beauty and advantage.

Man is the only being adapted by his organization to go erect. Many have supposed that the ourang-outang originally possessed this commanding advantage, but in consequence of some misdemeanor, he was condemned to be prone. But Cuvier and Lawrence have exposed the fallacy of this hypothesis. They have shown that although this animal, and indeed, the entire baboon tribe, have the power of supporting the erect posture, they cannot maintain it but a short time, without much inconvenience. Man is the only creature that is capable of assuming and maintaining this sublime attitude. By his legs and feet, he is fitted for every kind of motion except that of flying; and though some animals excel him in temporary speed, none can vie with his universality and diversity of locomotion, nor in the power of continuing it. A man cannot out-run a horse for a limited distance, but in a protracted journey will frequently walk him down.

THE HUMAN HAND.

The second peculiarity that we would notice, is the hand and arm. This is the scepter of his power—his instrument of dominion—his all-conquering and all-transcending mechanism. There is not an animal to be found that exhibits a limb so advantageously situated as the human hand and arm. Reflect for a moment, and you will see the beauty of its arrangement. The lateral attachment of the arms to the trunk of the body, and the erect attitude, gives us the freest use of these admirable instruments. So greatly does man excel animals in the conformation of his hands, that some of the philosophers of old

asserted, "that man is the wisest animal, because he possesses hands." We do not subscribe to this view, yet we are of the opinion that Aristotle is well justified in observing, "that man alone possesses hands really deserving that name."

Many animals, also, have hands, but they will not compare in any degree with those of man. The great superiority of the human hand arises from the size and strength of the thumb, which can be brought into a state of opposition to the fingers; and hence is of the greatest use in enabling us to grasp spherical bodies, and take up objects in the hand, in giving a firm hold on whatever we seize, in executing all mechanical processes of the arts, in writing, drawing, cutting—in short, in a thousand offices which occur every moment of our lives, and which could not be accomplished at all if the thumb were absent, or would require the concurrence of both hands, instead of being done by one only. Terminating as the human hands do, by long and flexible members, of which only a small portion is covered by the flat nails, while the rest is furnished with a highly organized and very sensible integument, they form organs of touch, and instruments of prehension, such as are not to be found in the whole animal kingdom.

THE COVERING OF THE BODY.

A third dissimilarity which may be remarked between man and the inferior animal, is the beauty and delicacy of the exterior covering of his body. "Hasty and splenetic men," says a distinguished writer, "have inveighed against Providence, for

sending us into the world so naked of all covering—so destitute of natural protection—so exposed to injuries and suffering of temperature and wet—while other animals have feathered, wooly, hairy, horny, shelly, or leathery outsides. Grumbling imbecility! Would any such querulous declaimers exchange their admirable skin for the hide of a beast, the scales of a crocodile, or the feathers of a turkey? Could any mind that sees, feels, or reasons, desire to have the physiognomy of a horse, an eagle, a lion, or an elephant, instead of the human face divine—instead of its lovely complexion, its eloquent features, its attractive delicacy, and its impressive dignity? But, independent of all beauty, and of all that delights the eye, the taste and the touch, in the human skin, who would relinquish the mental advantages which we derive from its exquisite nervous sensitivity? We could not have a large portion of our sensations and ideas without it. It is the delicate sensibility of the ends and inside of our fingers, and our palm, which provides us with an important part of our most useful knowledge. The connection is unceasing between our mind and the delicate skin. A fine nervous expansion, proceeding from the brain, is purposely spread over the outside of the body, immediately under the last cuticle. That our intellect may have the benefit of this universal sensitivity, it is materially associated with our moral feelings, and with our best sympathies. No small portion of the tenderness of our nature, and of our compassionate benevolence, are related to it. With the hide of the rhinoceros, or the shaggy coat of a bear, we should not possess the

feelings of human nature, nor the intellectual sensibility of a cultivated mind."

THE SHAPE OF THE HEAD.

The head is the location of numerous and important organs. It is the seat of the great controlling powers of the body, of the organs of the senses, and is intimately connected with deglutition and respiration. If we inspect the head of man carefully, we will find that there is a remarkable difference between it and other animals. The cranial expansion is infinitely above that of the brute. His face is very small in proportion to the cranium, when compared with the animal kingdom at large; and we find, as a general rule, that as the proportion of the cranium exceeds that of the face, the intelligence increases, and *vice versa*.

Camper, the distinguished naturalist, to determine the amount of intellect enjoyed by different animals and races of men, proposed what he called the *facial angle*. It consists simply in drawing a line from the greatest projection of the forehead to that of the upper jaw bone, thence horizontally backward. It will appear evident, that this angle will increase as the forehead becomes developed, and the face smaller; and the reverse, as the face is more prominent and the forehead more retreating. This angle is about 80° in the European race; about 70° in the negro; in the monkey race varying from 60° to 30° ; and as we descend in the scale of animals it becomes very acute. Thus in the horse, the forehead is very retreating, and the angle very small, (23° .) In some birds it cannot be measured.

In man, as we have already seen, the forehead is nearly on a line with the face. This arrangement does not exist in any other animal; on the contrary, the face projects far beyond the forehead, so that in them the anterior lobes of the brain are not placed over it, as in the human subject. This prominence of the face, or, as it is more commonly called in the inferior animals, the muzzle, is adapted to the horizontal posture, and is favorable to the development and action of organs placed in this part. The nose, or *snout*, of many animals is a highly developed organ, and occupies a considerable portion of the face; while in most animals the mouth is not merely destined to mastication, but is the chief organ of prehension, and weapon of offense and defense. Hence the size and form of the nose and mouth in man differs essentially from them. The mouth of man is chiefly destined to mastication, taste, and speech; it does not, therefore, present the strong and widely-expanded jaws, powerful muscles, and formidable fangs, so characteristic of many animals.

THE SIZE OF THE BRAIN.

There is no animal whose brain will compare with that of man's, either in the structure of its parts, the number of the organs, or its superior size. Aristotle laid down the maxim, "that man has the largest brain of all animals in proportion to the size of his body." But of late this maxim has been proved to be erroneous. Sommering has compared the brains of a great number of animals, and has corrected the rule of Aristotle by a modification, under which it appears to hold universally, and thus cor-

rected, it runs as follows: "Man has the largest brain of all animals in proportion to the general mass of nerves that issue from it." Thus the brain of the horse gives one-half the weight of that of man, but the nerves it sends forth are ten times as bulky. The largest brain which Sommering ever dissected in the horse tribe, weighed only 1 lb. 4 oz.; while the smallest he ever met with in an adult man, weighed 2 lbs. 5½ oz.

The most striking characteristic of the human brain, however, is the prodigious development of the cerebral hemispheres, to which no animal, whatever ratio its whole brain may bear to its body, affords any parallel. It has the deepest and most numerous convolutions, apparently in consequence of its size, as the purpose of this structure seems to be that of affording a more extensive surface for the application of the vascular membrane, the *pia mater*. The convolutions become fewer and shallower as the brain diminishes in size. There is none in the rodentia, none in very small brains. It is, also, the most perfect in the number of its parts; none being found in any animal which man has not; while several of those found in man are either reduced in size, or are deficient in various animals. Hence it has been said, that by taking away, diminishing, or changing proportions, you might form from the human brain, that of any animal; while on the contrary, there is none from which you could, in like manner, construct the brain of man.

THE SUPERIORITY OF THE HUMAN INTELLECT.

Although man is inferior to many animals in physical strength, yet in regard to the power and

magnificence of his intellect he has no superior. The inferior creatures never improve. They always perform the same work in the same manner, the execution of any individual being neither better nor worse than that of any other; in whom the individual, at the end of months, is what he will remain through life. Contrast the result of human industry and invention, and the fruits of that perfectibility which characterizes mankind collectively and individually. "By the intelligence of man the animals have been subdued and tamed; by his labors marshes have been drained, rivers confined, forests cleared, and the earth cultivated. By his reflection, time has been computed, space measured, the celestial motions recognized and represented, the heavens and the earth compared. He has not merely executed, but has executed with the utmost accuracy, the apparently impracticable task assigned him by the poet :

'Go, wondrous creature ! mount where science guides;
Weigh air, measure earth, and calculate the tides.'

"By human art, mountains have been overcome, and the seas have been traversed; the pilot pursuing his course on the ocean with as much certainty as if it had been traced for him by engineers, and finding at each moment the exact point of the globe on which he is, by means of astronomical tables. Thus nations have been united, and new worlds have been discovered; opening such a field for the unfettered and uncorrupted energies of our race, that the senses are confused, the mind dazzled, and judgment and calculation almost suspended by the grandeur and brightness of the glorious and inter-

minable prospect. The whole face of the earth at present exhibits the works of human power, which, though subordinate to that of nature, often exceeds, at least so wonderfully seconds her operations, that by the aid of man her whole extent is unfolded, and she has gradually arrived at that point of perfection and magnificence in which we now behold her."

In this point of view, man stands alone: his faculties, and what he has effected by them, place him at a wide interval from all animals.

THE MORAL FACULTIES, OR MORAL SENSE.

This constitutes the most exalted attribute of our species. The sense of accountability to an overruling and resistless power, which is neither seen, nor heard, nor appreciable by any of our senses, before which we must bow, characterizes man as the "noblest work of God." Many individuals have alleged that the existence of a God is an obvious, an unavoidable deduction of reason; that the admirable order and adaptation of everything we see, necessarily implies design, and this design a designer. But though it be admitted that the wonders of nature that everywhere surround us, proclaim to the enlightened mind the presence of God; though reason undoubtedly comes in with its high sanctions to confirm and regulate the suggestions of this religious or moral sense, yet it would seem that this is an original endowment, written in our very constitution, and to a certain extent independent of, and superior to, reason. Other animals possess reasoning powers; but man is the only inhabitant of this planet that gives any consciousness of the existence

of such a power, and of moral duties and obligations as a means of conciliating this being. It is this alone that enables him to paint the dark and mysterious future, with a thousand brilliant hopes, and “to place as it were, a crown of glory on the cold brow of death.”

“How poor, how rich, how abject, how august,
 How complicate, how wonderful, is man!
 * * * *
 Connection exquisite of distant worlds!
 * * * *
 Midway from nothing to the Deity!
 A beam ethereal, sull’d and absorpt!
 Though sull’d and dishonored, still divine!
 Dim miniature of greatness absolute!
 An heir of glory! a frail child of dust!
 A worm! a God!” * * * YOUNG.

VI.

The Functions of the Brain.

PART FIRST.

IN entering upon a discussion of the functions of this important organ of the human body, it is necessary that we should dismiss from our minds all our prejudices and fears. If we enter into the examination of any question with the spirit of the bigot and partisan, suffering a cloud of fears and hopes, desires and aversions, to hang around our understandings, we will never discover objects clearly; they will be confused, distorted, and obscured by the murky clouds of intellectual mist. Our duty as moral and intellectual beings, is to inquire what is true, not what is the finest theory; nor what will administer pleasure to the prejudices and passions of mankind. We need not fear the result of investigation. Reason and inquiry are the only effectual antidotes of error. Give them free scope, and they will uphold truth by bringing false opinions, and all the spurious offspring of ignorance, prejudice and self-interest, before their severer tribunal, subjecting them to the test of close investigation. Error alone needs artificial support—truth can stand by itself.

The principal function performed by the brain, particularly the cerebrum, is THOUGHT. That this is the function of the brain, can be proved by the most abundant evidence. Pressure upon the brain and injuries of the head, furnish most conclusive proof. When a part of the brain has been laid bare by an injury inflicted upon the skull, it has been found that the operations of the mind could be suspended at the will of the surgeon, by merely pressing on the brain with his fingers, and that it could be restored again by withdrawing the pressure. The recital of a few cases may not be uninteresting to the reader.

M. Richerand, a celebrated French physician and physiologist, had a patient whose brain was exposed in consequence of disease of the skull. One day, in washing off the purulent matter, he chanced to press with more than usual force, and instantly the patient stopped short in the middle of a sentence, and became altogether insensible. As the pressure gave her no pain, it was repeated several times, and always with the same result. She uniformly recovered her faculties the moment the pressure was taken off.

Dr. Chapman, of Philadelphia, mentions in his lectures a similar case to the above. The individual became perfectly insensible the moment pressure was applied to the brain.

The following remarkable case, showing the effect of pressure upon the brain, is recorded by Cooper, in his lectures on surgery, and proves most conclusively the doctrine now under consideration. A man by the name of Jones was deprived of con-

sciousness by being wounded in the head while on board a vessel in the Mediterranean. In this state of insensibility he remained for several months at Gibraltar, when he was transmitted to Deptford, and subsequently to St. Thomas' Hospital, London. Mr. Cline, the surgeon, found a portion of the skull depressed, trepanned him, and removed the depressed part of the bone. Three hours after this operation he sat up in bed; sensation and volition returned, and in a few days he was able to get up and converse. The last circumstance he remembered was the capture of a prize in the Mediterranean thirteen months before.

That the brain is the organ of thought or the mind, is further proved by the phenomena observed when it is exposed to view in consequence of the removal of a part of the skull. It has been noticed in such cases, that when the individual was calm, and the mind not disturbed by any peculiar emotions, the brain was comparatively motionless; but on the contrary, when the feelings became excited, in a moment the blood was sent to it with increased force, and the pulsations became more frequent and violent. An interesting case of this kind is reported by Dr. Pequin, as having been observed by him in the hospital of Montpelier. The patient was a female, who had lost a large portion of the skull and dura mater, so that a corresponding portion of the brain was open to inspection. When she was in a dreamless sleep, her brain was motionless, and lay in the cranium. When her sleep was imperfect, and she was agitated by dreams, her brain moved and protruded without the cranium. In

vivid dreams, reported as such by herself, the protrusion was considerable, and when she was perfectly awake, especially if engaged in active thought or sprightly conversation, it was still greater. If the mind was not intimately connected with the brain, these phenomena would never present themselves.

Modern physiologists, in treating of the functions of the brain, with a few exceptions, regard it as the instrument of thought. W. Lawrence, in his lectures on the physiology, zoology and natural history of man, makes the following remarks upon the brain :

“If the mental process be not the function of the brain, what is its office? In animals, which possess only a small part of the human cerebral structure, sensation exists, and in many cases is more acute than in man. What employment shall we find for all that man possesses over and above this proportion—for the large and prodigiously developed human hemispheres? Are we to believe that these serve only to round the figure of the organ, or to fill the cranium?

“It is necessary for you to form clear opinions on this subject, as it has immediate reference to an important branch of pathology. They who consider the mental operations as acts of an immaterial being, and thus disconnect the sound state of the mind from organization, act very inconsistently in disjoining insanity also from corporeal structure, and in representing it as a disease, not of the brain, but of the mind. I firmly believe, on the contrary, that the various forms of insanity, that all the affections comprehended under the general

terms of mental derangement, are only evidences of cerebral affections, disordered manifestations of those organs whose healthy action produced the phenomena called mental; in short, symptoms of diseased brain.

“I have examined after death, the heads of many insane persons, and have hardly seen a single brain which did not exhibit marks of disease; in recent cases, loaded vessels, increased serous secretions—in all instances of long duration, unequivocal signs of present or past increased action; blood-vessels apparently more numerous; membranes thickened and opaque; deposits of coagulable lymph, forming adhesions or adventitious membranes, watery effusions, even abscesses; add to this that the insane often become paralytic, or are suddenly cut off by apoplexy.

“Sometimes, indeed, the mental phenomena are disturbed without any visible deviation from the healthy structure of the brain; as digestion or biliary secretion may be impaired or altered without any recognizable change of structure in the stomach or liver. The brain, like other parts of this complicated machine, may be diseased sympathetically, and we see it recover.

“Thus we find the brain, like other parts, subject to what is called functional disorders. The brain does not often come under the inspection of the anatomist, in such cases of functional disorders, and I am convinced from my own experience, that very few heads of persons dying deranged will be examined after death without showing diseased structure, or evident signs of increased vascular activity.

“The effect of medical treatment completely corroborates these views. Indeed, they who talk of and believe in diseases of the mind, are too wise to put their trust in mental remedies. Arguments, discourses, sermons, have not yet restored any patient; the moral pharmacopœia is quite inefficient; and no real benefit can be conferred without vigorous medical treatment, which is as efficacious in these affections as in the diseases of any other organ.”

If the brain is not the organ of thought, it yet remains a strange anomaly of wonderful mechanism altogether without use. But we are confident that man, in consequence of his superior cerebral organization, is elevated above all the creatures that surround him. We also find in him that the thinking principle is quite different from that in inferior animals. The latter have no moral faculties to indicate to them that the unrestraining manifestations of the propensities are wrong. They have no sentiment of reverence to prompt them to seek a God whom they may adore; they have no hope pointing out futurity as an object of ceaseless anxiety and contemplation, and leading them to desire life beyond the grave; and, indeed, the convolutions of the brain, which in man constitute the organs of these faculties, do not exist in the lower animals. Those parts of brain in man which serve to manifest the faculties of reflection, are eminently defective in the lower animals, and their understanding, in exact correspondence with the fact, is so limited as to be satisfied with little knowledge, and to be insensible to the comprehensive design and glories of creation.

PART SECOND.

Many physiologists are willing to admit that the brain, as a whole, is the organ of the mind, but reject the idea of its manifesting a plurality of organs. It will be our object, in this part, to show upon what evidence this doctrine rests.

The plurality of the mental organs was first discovered by Dr. Gall, a German physician—a discovery that will render his name as immortal as that of Hervey or Newton.

When quite a youth, Dr. Gall was led by observation to the fact that the various mental manifestations of different individuals were accompanied by a peculiar configuration of the head. In the course of his observations, he found that some of his companions were distinguished for accuracy and power of remembering words, and that those thus gifted had prominent eyes. He therefore inferred, that if memory of words was connected with external signs, the same might be the case with the intellectual powers. Hence every individual marked for any peculiarity became the object of his attention and study.

It would be interesting to trace the various steps by which Dr. Gall proceeded in his discoveries, but it would extend this chapter beyond the bounds prescribed. Suffice it, however, to say, that he did not, as many have alleged, first dissect the brain, and pretend by that means to discover the location of the mental faculties; neither did he, as others have asserted, first map out the skull in different regions, and assign a function to each, according to the imaginings of his own fanciful intellect. But, on the

contrary, he first observed a coincidence between the mental powers and the shape of the head; he next removed the skull, and ascertained, by actual inspection, that the figure and size of the brain are indicated by external appearances; and it was only after these facts had been determined, that the brain was minutely dissected, and light thrown upon its complicated structure.

Analogy, independent of observation, would lead any reflecting mind to conclude that the brain has a plurality of organs, each performing an entirely distinct function. Every operation of the body is performed by different instruments. For instance—the ear hears, the eye sees, the nose smells, and the tongue tastes. Each has but one function. Now there is as much difference between a thought and a feeling as there is between a sound and an odor; indeed, you might as well hear and smell with your nose as feel love and anger with the same portions of brain. But there are still minute analogies, which cannot but deepen our conviction of the truth of the plurality of the mental organs. Look at the nerves, those fine and almost invisible strings that run from all the different parts of the body up into the brain. Their number and their distinct and separate functions are wonderful. Let us instance a little. There runs from the tongue one nerve to move it, another to taste with, and a third to communicate the feeling of pain, should the tongue be injured. So in regard to other parts of the body—the arm, for instance; one nerve gives motion, another touch, another the sensation of pain. There are numerous similar examples, but we have enough. As far as I am ac-

quainted with physiology, I know of no nerve, with but one exception, which performs two functions. Hence, in the case of the brain, analogy would lead us to expect that, if reasoning be an act essentially different from loving or hating, there will be one organ for reasoning and another for loving.

Further proof of the fact that different parts of the brain perform different offices, may be drawn from the effect which injuries upon the brain produce. Injuries of the anterior lobes of the cerebrum affect the intellectual faculties, while injuries of the middle and posterior lobes affect the propensities and moral sentiments. It has been long admitted by physiologists, that injuries of the cerebellum and medulla oblongata affect the organs of sensation and muscular motion. And, indeed, death follows much quicker from any injury to the last named parts than the cerebrum; showing at once that the vital organs are more dependent upon these parts of the brain than any other.

The following case of injury of the head, reported by Dr. Drake, in the *Western Journal of Medical and Physical Science*, affords most conclusive proof of the plurality of the mental organs. In 1835, Dr. Drake resided at Cincinnati, Ohio, and the individual whose head was affected was Mr. C. Van Zandt, of Louisville, Kentucky. This individual called upon Dr. D. for advice, complaining of pain in his head. He had received a contusion upon the head, near the outer angle of the eye, by a ball. At this time he had almost entirely lost the power of recollecting proper names.

“When he called upon me,” says Dr. Drake, “he

could not tell the name of the city (Louisville) to which he belonged, nor of the river (Ohio), nor of the steam boat on which he made the voyage, nor of the city where he then was (Cincinnati), nor my name. To enable himself to find me, he had written my name upon a bit of paper, from which he read it when inquiring for my office. * * * I at first supposed, for a moment, that he was deranged or idiotic, but soon discovered that his mind was otherwise sound, for his narrative was intelligible, and well connected, though when he came to a proper name he stopped, and had to substitute a description of the object."

In every interview Dr. D. had with him, the same phenomena was manifested, though once or twice he succeeded in recollecting the name which was desired. He could not recollect the names of the physicians who had attended him, though he could distinctly recollect all they had done for him. He could not recollect the names of the journeymen he had in his employ, though he could state their different qualifications. It was with great difficulty and study only that he could on any occasion recollect his children's names, or his own baptismal name.

"Without indulging in conjecture," says Dr. Drake, "I shall direct the attention of the reader to the fact, that the seat of his pain is near the part of the brain which the phrenologists regard as the organ of language, situated immediately behind the globe of the eye."

But, independent of analogies and partial injuries of the brain, daily experience may satisfy every individual that the mind acts through a plurality of or-

gans. "A person receives an affront in a venerable assembly, and the following mental states present themselves simultaneously: he feels anger, yet he feels awe or respect for the persons present: he uses reflection and restrains his wrath. These states of mind may co-exist for hours. A single organ could not serve to give consciousness of indignation, to feel awe, and to practice restraint, all at the same moment; but it is quite practicable by a plurality of organs. Indeed, we are able at the same moment to manifest opposite emotions in our actions, if we employ different instruments in doing so. A man may wound another deliberately with a dagger, and at the same instant speak peace to him and smile in his face. An artist may execute a drawing, and at the same instant sing a song. If one cannot compose poetry and calculate logarithms at the same moment, it is because some of the organs required in the one operation are necessary also in the other, and the same organs cannot perform two duties at once."*

It is only by admitting the plurality of the mental organs, that we can solve satisfactorily the phenomena of perception, memory, attention, judgment, reasoning, the moral sense, partial genius, will, dreaming, and monomania. For a full elucidation of these topics, I would refer the reader to Combe's System of Phrenology. And I would here add, that I know of no source from which we can derive a true knowledge of the philosophy of mind, but phrenology. If, instead of definite, demonstrable truth, phrenology presented only the conflicting vagaries of the

* Combe's System of Phrenology.

metaphysical theories of Stewart, Locke, Reid, and Brown, I should never be found recommending its study to any one. But it is the only science of mind which consists exclusively of facts, and their classified arrangement—dealing only with the certainties that sense and reflection are competent to attain, and walking cautiously by the sound rule, “that first causes and the innate nature of things is the wisdom of God, observation and legitimate deduction the proper knowledge of man.”

PART THIRD.

SIZE OF THE BRAIN AN INDEX OF MENTAL POWER.

Throughout creation, at least as far as human discovery has penetrated, including both living and dead matter, other things being alike, *size is the exact and never failing measure of power.* Apply this fundamental principle of nature to the brain—subjecting it to the requisite scrutiny, and you will find that it will pass the ordeal of inspection without harm.

The brain is a living organized substance, and is governed by the same laws, and changes from better or worse, by the same means and modes of actions, with other masses of organized and living matter. To illustrate this position, let us for a moment refer to the muscular system. That, other things being equal, the size of the muscles correctly indicate the amount of their strength, is doubted by no one. A man possessing large muscles, is always regarded as proportionately strong, unless he be under the influence of some debilitating cause. Enfeebling causes, however, that are in constant operation on us, are both numerous and varied, yet numerous as they are,

their influence is limited. Take, therefore, promiscuously from the same crowd a hundred large men, and a hundred small ones, and the average of strength will always predominate in favor of the former.

Respecting brains, the same is true; take, without selection, a hundred men with large heads, and a hundred with small ones, and the average of mentality possessed by the former will uniformly surpass that possessed by the latter. And it would be easy to show, on physiological principles, that all kind of agencies which strengthen or enfeeble the brain, muscles, and other organs, are virtually the same. By the by, it may be well here to remark, that it is no very new idea, that a large sized brain is indispensable to mental power; this principle was recognized by the ancients in their statuary. In all those which represented heroes or athletæ, gifted with prodigious bodily powers, the head is very small in proportion to the rest of the body. In the statues of Hercules, the head scarcely equals in size the top of the shoulders. The statues alone of the king of the gods present the singular combination of an enormous head resting on limbs of a diminutive size, as if a vast brain had been necessary to one whose intellect carried him at a glance over the whole universe.*

From what has been said in relation to the size of the brain, as an index to mental power, the reader must bear in mind that the phrenologist does not compare general size and general power; a man may have a small head in the aggregate, and a powerful intellect; or he may have a large head in the

* Richerand's Physiology.

aggregate, and a feeble intellect. Hence, in judging the powers of the mind by the size of the brain, we must attend to the following conditions, which modify the effect of size, viz. constitution or quality of brain, particular location of brain, health, and age.

The constitutional qualities of brain are of four kinds, and are indicated by the different temperaments of the body, which give rise to different degrees of activity in the brain. I will therefore briefly describe them.

THE PHLEGMATIC OR LYMPHATIC TEMPERAMENT.—This temperament is one of comparative dullness, inactivity and debility. Of those who possess it, the stature is rarely lofty or athletic. The complexion is light; but instead of being delicately or brilliantly fair, its whiteness is dull and dead-like, indicating a languid and scanty circulation of the blood through the skin. The eyes are usually blue, but sometimes gray and hazle. The hair is light, soft, and sometimes flowing. The expression of the countenance is deficient alike in vivacity and strength. The movements of the body are slow and seldom graceful. Persons of this temperament seldom accomplish much, no matter how nicely their heads may be formed. They lack constitutional vigor, which is always attended with a corresponding mental weakness.

SANGUINE TEMPERAMENT.—Individuals who possess this temperament differ widely from those of the phlegmatic, and many are the very opposite. All here is life and activity. The complexion is fair and ruddy. The skin is amply supplied with well prepared blood. The eyes are blue, gray, or light hazle.

The hair is yellowish, flaxen, or auburn, and sometimes sandy and red. The countenance is unusually sprightly and cheerful. The temper, though variable, is rarely if ever gloomy, dull, or morose. All things are in the spring-time to it. A fullness of life, with something of levity and thoughtlessness, rather than of strength and steadiness, characterizes this temperament. Persons possessing it are seldom masterly and profound. They are pleasant companions, but are better fitted to accompany, or follow and execute, than to lead and command.

This temperament and the lymphatic are embraced in one by the Fowlers, called *vital*, depending as it does upon the digestive, the circulating, and respiratory systems.

NERVOUS TEMPERAMENT.—This temperament is less definitely marked, and therefore more difficult of description than either the phlegmatic or sanguineous. The complexion, instead of being fair, transparent and ruddy, or white and inanimate, is light, delicate and pearly. The hair, eye-brows, and eyes, are more frequently dark than light colored. The sensibility is vivid and deep; the looks and expressions have a keenness inclining to intensity. The attention, though capable of rapid transition, is, while *directed* to anything, unwavering and close, and the movements are generally lively and quick. The frame is rarely of large dimensions, and the person is usually inclined to be spare. The manifestations both mental and corporeal bespeak a fitness for rapid and delicate action, rather than for great muscular strength. Poets are usually of this temperament.

BILIOUS TEMPERAMENT.—This temperament pre-

sents a character far different from those of the foregoing, and of much greater power. It presents nothing fair, ruddy, soft or delicate. Every feature of it is masculine and staunch, and their combination indicates rigidity, sternness and strength. The complexion is brownish or olive, according to the influence of the climate and exposure. The hair is black, strong, coarse, and sometimes curly and bushy; the eyes are dark and lustrous, and the expression of the countenance is resolute and manly. The person though never full in flesh, is highly muscular. The stature is rather tall, and the frame close-built and sinewy. The temper is exceedingly abrupt, impetuous and violent. Individuals of this temperament who have large heads, well formed, manifest great vigor in the conception of a project, steadiness and inflexibility in pursuing it, and indefatigable perseverance in its execution. It is to this temperament we are to refer the men who, at different periods, have seized the government of the world. Hurried forward by courage, audacity and activity, they have signalized themselves by great virtues, or by great crimes, and become the terror or the admiration of the world.

The temperaments are seldom found pure; they unite in various ways so as to form what is called the nervous-bilious, the nervous-sanguine, &c. The best temperament for physical labor is the sanguine-bilious; for intellectual, bilious-nervous, combined with a share of the sanguine.

From the above description of the temperaments, it will be clearly seen that they have a great effect in modifying the influence of size.

But let us see for a moment what the consequences are. As a general rule, all parts of the brain have the same constitution, and if size be a measure of power, then in each head the larger organs will be more powerful than the small ones. This enables us to judge of the strong and weak points in each head. But if we compare two separate brains, we must recollect that the size of the two may be equal, and that, nevertheless, the one, from possessing the finest texture and most vigorous constitution, may be exceedingly active, while the other, from being inferior in quality, may be naturally inert. The consequence is, that the better constituted, though smaller brain, will manifest the most mental vigor and power.

The SECOND condition of size is *the location of the brain*. Anatomists usually divide the brain into three parts: the *cerebrum*, or brain proper; the *cerebellum*, or little brain; and the *medula-oblongata*, which lies below the cerebrum, and level with the cerebellum, and gives birth to the spinal marrow. The cerebrum consists of two hemispheres, separated by a strong membrane, called the *falciform process* of the *dura mater*, which passes from the middle of the forehead to the back part of the head. The cerebellum is separated from the cerebrum by a membrane called the *tentorium*. Each hemisphere of the cerebrum is divided into three lobes, the anterior, the middle, and posterior. The anterior lobes, which are situated in the forehead, are the seat of the intellectual faculties; the upper part of the middle lobes, are the seat of the moral powers; while the lower part of them, and

the whole of the posterior lobes, are devoted to the propensities. Now, either of these lobes may be small or large. In such a case, there will be either perfect or imperfect manifestation of some of the mental faculties. If, for example, the base of the brain be very large, and the anterior lobes decidedly small, although the head as a whole may be large, there will be a lack of intellect. In such a head there will be much more animal than intellectual, more physical than mental power. On the other hand, where the anterior lobes are very large, and the other parts small, there may be intellectual power, but not force enough to use it to advantage. If the intellectual organs and propensities be large, and the moral organs small, there will be power both intellectual and physical, but it will not be directed into its proper channel,—hence, the individual will be dangerous in the community. If all the lobes of the brain be very small, there will be a deficiency in all the mental manifestations, intellectual, moral and physical. In order, therefore, to have a good head, each part must be full.

Pope Alexander VI. had brain enough, and so had Melancthon. Contrast their heads. In the one, we have a fine development of the moral and intellectual lobes, while the propensities are small. In the other, we have enormous propensities, considerable intellect, and small moral organs. Hence the difference in their characters; the first, the highly intellectual and moral associate of Luther in effecting one of the most glorious reformatations that ever dawned on the world. The latter, a cunning, selfish, and cruel tyrant.

We regard it, therefore, an established principle in the physiology of the brain, *that the location of the principal mass of brain, furnishes a direct index to the mental characteristics of the individual.*

The THIRD condition of size is *age*. The effect of age, or periods of life, on mental manifestations, is known to every attentive observer; and to the anatomist and physiologist its effects are equally well known. And, indeed, he finds that the brain has as many ages, if not more, than Shakespeare gives to man. There is, for instance, a brain of infancy and childhood; another of boyhood; a third, of juvenility; a fourth, of early manhood; a fifth, of mature manhood; a sixth, of declining manhood; a seventh, of early old age; and an eighth, of the childhood of extreme senility. And each of these differ, more or less, from all the others. So do the manifestations of mind; all the different periods of age through which the brain passes, differ from each other, in a corresponding manner and degree.

In infancy and childhood the brain is superabundant in fluid substance, and, therefore, tender and feeble, defective in organization, and altogether immature. "At this period," says Meckel, "the brain weighs about ten ounces, and so abundantly is it supplied with blood, and so rapidly does it increase in size, that at the age of seven it weighs about three pounds." Its consistency, during this period, is also gradually increasing; it is thereby becoming firmer, more consistent, and less vascular; the difference between the medullary and cortical portions is more prominent; the former is less red, the latter, deeper colored; the convolutions better marked, and so the

peripheral surface more extended. But the mental faculties are yet in a weak and crude condition. In boyhood and juvenility, the brain is vastly improved in condition and strength, and the mental powers too; in early manhood, their improvement is still higher, and by the prime of life, they, like the organs of the body generally, are in their prime.

The next change exhibited by the brain and the mental phenomena, is when they enter upon the declivity of life; and that portion they also pass over in the same harmony, in relation to the mutations sustained by them, with which they had previously made their ascent. Every deterioration which the lapse of time produces in the brain, is accompanied by a like deterioration of mental action. And thus proceed the kindred changes until death arrests them.

There are, however, some exceptions to this rule, but generally speaking it is the cerebral and mental history of all whose lives have been protracted to the period of old age. In estimating the powers of the mind, by the size of the brain, this condition should never be neglected.

The FOURTH condition of size is *health*. It not unfrequently occurs, that disease has made such havoc in the brain, that the natural tone is entirely lost. Intemperance and other vices have such an influence upon it, that it gradually loses its power, until insanity or idiocy is the result. In other instances the digestive apparatus is so feeble that it is not able to supply the brain with its appropriate nourishment, either in quantity or quality, consequently its operations are impeded, and its manifestations are feeble.

Such cases may be regarded as exceptions to the general rule of size being a measure of power.

Notwithstanding the exceptions which I have named, to size being a measure of power, when applied to the brain, yet so indispensable is it to the manifestation of mind, that when the circumference of the head, taken above the eyes, does not exceed thirteen inches, imbecility and idiocy always attend, according to Gall; and Dr. Voison, a celebrated French physician, found on careful examination, that idiocy was complete when the measurement varied from eleven to thirteen inches, while that from the root of the nose over the head, to the spine of the occiput, measured but between eight and nine inches. In the full sized head, the former measurement averages twenty-two inches; the latter, thirteen. In the heads of very distinguished men it passes this average; thus, the skull of Spurzheim measured twenty-two and one-quarter, and thirteen and six-tenths inches, respectively. It should be remembered, however, that a person may have a large head and still be idiotic, the deficiency existing in the structure, not in the size of the brain.

That size is a measure of power when applied to the brain, (other things being equal,) is now admitted by the most distinguished physiologists of the age. Magendie, Carpenter, and Solly, all agree *that the volume of the brain is generally in direct proportion to the capacity of the mind*; and it is surprising that any individual, who has paid the subject the least attention, should be found, in the present age, to controvert so obvious a proposition.

PART FOURTH.

CONDITIONS TO BE COMPLIED WITH IN ORDER TO SECURE
A HEALTHY AND VIGOROUS ACTION OF THE MIND.

The brain being regarded as the organ of the mind, it follows, as a matter of course, that to secure its healthy and vigorous action, we must comply with those laws which have been established for its government. To anticipate clearness of perception, power of memory, and strength of judgment, while neglecting or disobeying those laws, is the height of folly and wickedness. It therefore becomes a matter of the greatest magnitude that we should be acquainted with those laws, that we may escape the evils consequent on their violation.

The FIRST condition of health in the brain is an *original sound structure*. If the brain possess, originally, a good condition; if it be free from all hereditary imperfections, and has received no improper treatment in childhood, it will withstand a great deal of labor and abuse before its health will give way. But if, on the other hand, either it inherit deficiencies, or early mismanagement has subsequently entailed upon it an unusual proneness to morbid action, it will give way under circumstances which would otherwise have been perfectly harmless.

Of all the causes which lead to imbecility and insanity, there is none more powerful than the transmission of an hereditary tendency from parent to child. It is a fact which cannot be controverted, that the offspring of insane persons are more liable to be affected with insanity than those whose pa-

rents have enjoyed sound minds. And it frequently occurs, that the descendants from an insane stock, although they do not exhibit the broad features of insanity, yet discover propensities and eccentricities equally disqualifying for the purposes of life, and destructive of social happiness. I have seen families in which it affected every member, and in others only one or two. When the original defect is on the mother's side, the evil extends more widely among the children (particularly if she have much force of character,) than when on the father's side. When both parents are descended from tainted families, the progeny is of course more deeply affected than when one of them is tainted.

An individual who is aware of a decided bias in his own person toward mental derangement, or one that he would select as his companion in the matrimonial state, ought to shun the chances of extending and perpetuating the ravages of so dreadful a calamity. A man so situated, in incurring the risk of becoming a parent, involves himself in a crime which may not improbably project its lengthened shadow—a shadow, too, which widens in proportion as it advances—over the intellect and happiness of an indefinite succession of beings. When, as it sometimes happens, an hereditary disposition or bias to this disease appears to sleep through one generation, it will often be found to awake in the next with even aggravated horrors. Should the child of an insane person escape his parent's malady, the chance is small that the grandchild will be equally fortunate. The continued stream of insanity, although it occasionally conceals itself for a time, may soon emerge to our view.

The SECOND condition necessary for the healthy action of the brain, is an abundant supply of *pure blood*. Pure blood is indispensable to the healthy action of every organ of the body, and the brain in particular. Thus, in extreme cases, where the stimulus of arterial blood is altogether withdrawn, the brain ceases to act, and sensibility and consciousness become extinct. Under ordinary circumstances, however, the changes in the quantity and quality of the blood are so slight, that their effects are less palpable; yet even when slightly deficient in quantity or quality, it is very injurious. If the vitality of the blood be in the least impaired, by breathing an atmosphere so vitiated as to be insufficient to produce the proper degree of oxygenation, or the diet be so scanty as not to afford the requisite quantity of nutriment, the blood then becomes an imperfect stimulant to the brain, and, as a necessary consequence, languor and inactivity of the mental organs ensue, and a tendency to headache and hypochondria make their appearance. This is seen every day in the listlessness and apathy prevalent in crowded and ill-ventilated schools, and in the headache and liability to fainting which are so sure to attack persons of a delicate habit in the contaminated atmosphere of crowded churches and other assemblies. And, indeed, I know of no cause more detrimental and productive of more disease to the brain and nervous system generally, than an imperfect oxygenation of the blood, whether it be caused by an impure atmosphere, or that destructive and wicked practice, TIGHT LACING.

A THIRD condition of mental health and power is *exercise*. No principle in the economy of the consti-

tution is better established, than that the proper exercise of every organ promotes not only the vigor and health of the organ, but also the entire system. And according to its function, as well as the nature of its relation to other organs, will be the effect of its excessive or deficient exercise on the whole body. This remark applies with peculiar force to the brain. And we invariably find that disuse impairs its structure, and weakens the mental powers which it serves to manifest. It is by the employment of this principle that the law subdues even the most violent and obdurate criminals. Placing a man in solitary confinement, without books, without occupation, and without light enough to see distinctly around him, is neither more nor less than withdrawing all means of activity from the cerebral organs. Its influence is so speedy and so terrible, that few natures, however rough, fearless, or brutal, are able to withstand it for many days, and few individuals who have undergone it once will ever have the rashness to expose themselves to it a second time. So much does this discipline weaken the mind, that the most unruly and ferocious ruffians, upon whom severity and blows had been expended without effect, have come forth subdued and tractable. The inference obviously follows, that to strengthen the brain we must exercise it regularly and judiciously, just as we would the muscular system, to give it tone and vigor. If we neglect to do so, weakness and imbecility will be the inevitable consequences.

This law of our constitution seems to me one of the most beautiful of the many admirable arrangements of a wise and beneficent Creator. We are

gifted with many high and noble attributes of mind, which are in close dependence on our physical organization. If we exercise them duly, we promote directly the growth, nutrition and health of the corporeal organs, and, indirectly, the whole system, and at the same time experience the highest mental gratification of which a human being is susceptible, viz. that of having fulfilled the end and object of his being, in the active discharge of his duty to God, to his fellow-men, and to himself.

VII.

Physiology of Digestion.

FEW things are so essential to life and health as a proper performance of the functions of digestion. Many can testify of the discomfort, when it deviates in but a slight degree from the normal standard; and he is, indeed, a happy man, who can pass through his daily duties without the thoughts and attention being directed to those operations for the solution, absorption and assimilation of nourishment, which in health are performed throughout without any attention, sense of pain, or disquietude. If there be any great amount of derangement of these functions, not only is the attention directed to them, and discomfort entailed, but there is reaction upon the higher capabilities of man's nature; the brain becomes less able to perform its functions, the judgment, the will, the memory, the whole power of thought and intellect, are less free to guide the man in his daily duty. The muscular movements and power are diminished, and the pleasure of life changed to daily suffering and anxiety. Contrast the vigor of mind and body during health with the enfeebled energy of the dyspeptic and hypochondriac. The former knows no impediment to the exercise of deep

thought and labor, in any sphere that the mind may dictate; the whole attention of the latter is absorbed by those functions which are at best only subservient to the manly exercise of mind and will.

We have a very striking exhibition of the correctness of the above views, as manifested in the case of the poet Burns. He suffered much from indigestion, producing hypochondria. Writing to his friend, Mr. Cunningham, he says: "Canst thou not minister to a mind diseased? Canst thou speak peace and rest to a soul tossed on a sea of troubles, without a friendly star to guide her course, and dreading that the next surge may overwhelm her? Canst thou give to a frame, tremblingly alive to the tortures of suspense, the stability and hardihood of a rock that braves the blast? If thou canst not do the least of these, why wouldst thou disturb me in my miseries with thy inquiries after me?" From early life, the poet was subject to a disordered stomach, a disposition to headache. He describes, in another one of his letters, the horrors of his complaints. "I have been for sometime pining under secret wretchedness. The pang of disappointment, the sting of pride, and some wandering stabs of remorse, settle on my life like vultures, when my attention is not called away by the claims of society, or the vagaries of the muse. Even in the hour of social mirth, my gaiety is the madness of a criminal under the hands of an executioner. My constitution was blasted *ad origine*, with a deep incurable taint of melancholy that poisoned my existence."

When the digestive process is entirely stopped, and no supply of nourishment absorbed and assimilated,

no fresh restoration of the waste entailed by the exercise of every function, life must sooner or later cease; and disease, in its ravages, presents few spectacles more distressing to witness than the gradual wasting of the frame, and cessation of life itself, from the non-supply of food. Thus the whole system sympathizes with disorder of the digestive functions.

Before speaking of some of the causes which lead to their derangement, we will very briefly notice the physiology of digestion. This is a wonderful process. It is a process by which certain substances are converted into breathing, acting life. It is the conversion of aliment into blood, which is the life of the animal body. The simplest kind of digestion is that performed by presenting a watery fluid to a moist surface, which converts it into its own nature. Examples of this are seen in the lower orders of animate life, the individuals of which consist almost entirely of a closed sack or pouch, on the external surface of which the above change is accomplished. On nearly the same line may be put the spongy extremities of the roots of plants, which absorb or drink up the nutrimental fluid from the soil. In others not quite so simple in their organization, this pouch has an opening through which the watery fluid enters, and is digested in its cavity.

In proportion as the animal structure becomes more complex, the preparatory organs are increased in number, to qualify the stomach for acting on the great variety of food, often of a solid and dense texture, which is taken for the purposes of nourishment. The most generally distributed apparatus for the breaking down and grinding the food,

before its reception into the stomach, is the teeth. In omnivorous animals, such as man, who appropriates to the gratification of his appetite food from all the kingdoms of nature, these instruments are of three kinds; the two chief, however, are the front or incisor teeth, which tear, and the back or molar teeth, which triturate and more minutely divide the alimentary matter in what is called mastication. It appears to be a fundamental principle in the history of digestion, that unless the nutrimental matter be of the very simplest kind, and presented in a fluid state, as in the lowest animals, and in vegetables, it requires to be subjected to some preparatory process before it can be received by the stomach, and undergo changes by which it is fitted for nourishing all parts of the living body.

The food, after having been subjected to the process of mastication, is conveyed by the œsophagus or gullet into the stomach. In man, the stomach lies under the convexity of the lower ribs of the left side, and is stretched toward the right, a little beyond the hollow, commonly called the pit of the stomach. In shape, it resembles a bag or a bag-pipe. Its left or larger extremity, called *cardia*, being in contact with the ribs, and its right and narrow extremity tapering downward, and terminating in a round opening called the *pylorus*, which opens into the uppermost part of the intestines. It is at the upper part of the *cardia* that the œsophagus enters. The structure of this organ consists of three membrous layers or coats.

1st. *Peritoneum*, or external coat. This membrane is smooth, white and glistening. In a state of health,

it admits none of the red particles of blood, but in inflammation they enter. This coat is formed by the peritoneum, a coat common to all the intestines. The use of this membrane is obviously to strengthen the stomach—to assist in binding down this organ and others in their respective situations, and by the smoothness and constant moisture of their surface, to enable them to move upon each other, and adapt themselves freely to their different states of emptiness and distension.

2d. The *muscular coat*. This coat consists exclusively of fleshy fibres, one layer running longitudinally, and a second running in a circular direction. The use of this coat is to make the stomach firm and strong.

3d. The *mucous coat*. This coat is smooth, unequal, velvety, and of a reddish white or pale pink color, and lines the entire inner surface of the stomach. From being of much greater extent than the other two coats, its surface is thrown into folds or wrinkles, which are simple in man, but very marked in gramivorous animals. Near the mouth of the stomach, this coat is doubled on itself, so as to form a ring, called the valve of the pylorus, the object of which is to prevent the too early exit of the food. The mucous coat is continually covered with a thin, transparent mucus. In addition to the folds just described, the mucous coat contains a great number of glandular bodies, some of which are not larger than a pin's head, which lie immediately beneath and almost incorporated with it. Besides these glands, the mucous coat is abundantly supplied with blood vessels, which ramify through it so as to form a net-work; and

nerves, or small whitish nervous filaments, are also distributed through its substance.

These latter are derived from a nerve called the pneumogastric, which comes from the brain down along the neck and through the chest, where it gives off thread-like branches to the heart, lungs and wind-pipe. We should not forget, that the mouth is the common opening into two passages, the one being directly at the root of the tongue, and forming the beginning of the wind-pipe, and terminating in the lungs; the other further back, and leading to the stomach. Mouth, wind-pipe, throat or gullet, lungs and stomach, are all lined with mucous membrane. Through this membrane in the wind-pipe, lungs and stomach, are distributed the numerous branches of the same nerve, twigs of which also go to the heart. Here we see at once two causes why the lungs, by which breathing is performed, should sympathize so much with the stomach, by which digestion is mainly accomplished.

From the inner surface of the stomach, is exhaled a fluid called *gastric juice*, which is the principal agent in converting the food that has been swallowed into a homogeneous semi-fluid mass, called *chyme*. The chyme, as fast as it is formed, is conveyed through the pylorus into the *duodenum*, or second stomach. It there meets with the bile from the liver, and the juice from the pancreas. By the action of these two fluids the chyme is changed into two distinct portions—a milk white fluid named *chyle*, and a thick yellow residue. The chyle is then taken up by absorbent vessels, called *lacteals*, or

milk-bearers, which are extensively ramified on the inner membrane of the intestines. From the lacteals, the chyle is carried through the mesenteric glands into the *thoracic-duct*, which empties itself into the left jugular vein, close behind the collar-bone, and thus the nutrient matters separated from the food by the digestive process become mingled with the blood, and after being submitted to the action of respiration, are rendered fit for nourishing and supplying the wastes of the body. The yellow residue, passing on through the intestines, is ultimately ejected *per anum* from the system.

Thus, in the process of digestion, five different changes are observed: 1st. The chewing and admixture of the saliva with the food; this process is called *mastication*. 2d. The changes through which the food passes into the stomach by its muscular contractions, and the secretion from the gastric glands; this is called *chymification*. 3d. The conversion of pulpy chyme, by the agency of the bile and pancreatic secretion, into a fluid called chyle; this is called *chyification*. 4th. The absorption of the chyle by the lacteals. 5th. The separation and excretion of the residue. For a more full description of these various processes, I must refer the reader to Combe on Digestion, or Carpenter's Physiology.

Having presented as concise a description of the physiology of digestion as the design of our article will admit, we will now notice some of the causes which impede and derange the healthy performance of this important function.

The FIRST cause of indigestion that we would notice, (and by no means an unimportant one,) is *imperfect mastication*. In this process, the teeth are

the grand instruments, and indeed without them mastication is never properly performed. It often occurs, that before the regular decline of life, while the other organs of the body are perfectly healthy, the teeth begin to decay, greatly to the annoyance and unhappiness of the individual. Physiologists have universally enumerated firm, sound teeth, among the signs of long life. Hufland, the distinguished German physiologist, says: "For good digestion, good teeth are extremely necessary; and we may therefore consider them among the essential properties requisite for long life, and in two points of view: 1st, good and strong teeth are always a sign of a sound, strong constitution, and good juices. Those who lose their teeth early have in a measure taken possession of the other world with a part of their bodies; 2d, the teeth are great helps to digestion, and consequently to restoration."

The principal causes of decayed teeth are, inherited infirmities, depraved digestion, tartar, substances being taken into the mouth too hot or cold, and mechanical injuries.

Hereditary predisposition is one of the most common and remarkable of the remote causes of decay or gangrene of the teeth. And it often happens that this tendency exists either in the whole or a greater part of a family of children, where one of the parents had been similarly affected; and this is true to so great an extent, that some authors on the teeth have observed the same part of the tooth affected in several individuals of the same family, and about the same age.*

* See Dr. Bell on the Teeth.

Under the head of depraved digestion, we may class all those diseases which afflict the stomach and bowels from infancy to manhood. And the remedy frequently employed for their cure exerts a most formidable effect upon the teeth. We have reference to MERCURY. This potent medicine, when administered in immoderate doses, operates upon the glands of the mouth and teeth, in such a way as to injure them for life. Again, we frequently see children with very bad teeth, which were never of the full size and whiteness, who are very fond of all kinds of sweetmeats and cakes, and whose teeth are said, by indulgence in these articles, to be readily decayed; hence the belief that sugar spoils the teeth. But this is a great error. Sugar contains no agent that directly affects the teeth, but being taken in large quantities, and that, too, not unfrequently after a full meal, may enfeeble the stomach, derange its healthy action, and in this manner affect the teeth secondarily.

Tartar is also a cause of decayed teeth. When this substance first commences to collect on the teeth, it is soft and friable, and readily dislodged from them, but it soon becomes hard, and adheres to the tooth with so much tenacity, that it is almost impossible to remove it without injuring the enamel. The usual color of tartar is a dull whitish yellow, dark brown or black, and sometimes slightly tinged with green. With the exception of gangrene, there is no kind of injury to which the teeth are exposed, so commonly and so extensively destructive, as this concretion of tartar. Let all, therefore, who value their teeth, take the hint in time, and not think it

too much trouble to regularly brush their teeth at least once a day—early in the morning is the best time. When this practice has been neglected, and tartar cannot be removed with a brush, it would be well to employ a dentist, and let him remove it with appropriate instruments. If this be neglected, the tartar will continue to collect until the gums and very bed of the teeth are absorbed; thus deprived of their support, they become loosened, and at length fall out.

Hot and very cold substances, when taken into the mouth, likewise injure the teeth. This is proved by the fact that some persons can chew substances of a blood heat, without inconvenience, when a piece of ice or a mouthful of hot tea will cause excessive pain in the teeth. Is it, then, remarkable that they decay, when we consider how many hot and cold substances are placed in contact with them? These affect the teeth in two ways: first, by acting locally upon the teeth; and secondly, by their stimulating effect upon the nervous system, and thus acting remotely upon the absorbent vessels, producing their decay. It is undoubtedly susceptible of the most positive demonstration, that fluids of a higher temperature than the blood, or those, on the other hand, which are very cold, are either primary or remote causes of decayed teeth.

Such are some of the causes of decayed teeth; and as there can be no good mastication without them, how important, then, that we should attend to their health, and avoid all those causes which have a tendency to injure or destroy them in any way. Human life has unquestionably been prolonged, by

means of the dental art, in replacing these important little instruments, when lost by decay or mechanical injury.

Taking large quantities of water or any other kind of fluid, directly before or after eating, is a cause of indigestion. When fluids are received with our food, they must first be taken up by the absorbents of the stomach, before digestion will commence; for the stomach refuses to secrete gastric juice in any considerable degree, as long as much fluid is present in it. Consequently digestion must be delayed in proportion to the quantity of liquid which is received with the food. Hence the practice that many individuals are in, of taking large quantities of tea or coffee with their food, is a habit which cannot be too severely denounced. Water alone, when taken in this way, is bad enough, but when combined with those narcotic poisons, it is rendered doubly worse. Individuals who are disposed to indigestion, should be on their guard in this particular, and not take too much water with their food.

Alcoholic drinks of all kinds impede digestion and destroy the coats of the stomach. Many individuals suppose that a moderate use of alcoholic drinks assists the stomach in the process of digestion, and some physicians have recommended a glass of brandy after dinner, as healthful and productive of great good to the system. But this is a great error, and leads to a great deal of disease and woe. Dr. Beaumont found, in some of his experiments upon St. Martin, that even one glass of wine interrupted the natural operation of digestion, and produced an unhealthy appearance of the stomach.

He gives the following description of the condition and appearance of St. Martin's stomach, after indulging freely in the use of alcoholic drinks for several days:

"August 1, 8 o'clock, A. M.—Examined stomach before eating anything; inner membrane morbid; considerable erythema* and some aphthous† patches on the exposed surface; secretions vitiated; extracted about half an ounce of gastric juice; not clear and pure as in health; quite viscid.

"August 2, 8 o'clock, A. M.—Circumstances and appearances very similar to those of yesterday morning.

"August 3, 7 o'clock, A. M.—Inner membrane of the stomach unusually morbid; the erythematous appearance more extensive, and spots more livid than usual—from the surface of some of which exuded blood; the aphthous patches longer and more numerous; the mucous covering thicker than common, and the gastric secretions much more vitiated.

"These experiments were continued on the 4th, 5th and 6th of August, at the usual hours. The state of the membrane, and the character of the fluids during the time, were gradually approximating to perfect health."

In concluding his remarks on this case, the Doctor makes the following statements:

"Diseased appearances, similar to those mentioned above, have frequently presented themselves in the course of my experiments and examinations, as the

* Erythema, inflammatory blushes, a morbid redness of the skin.

† Small spreading ulcers.

reader will have perceived. They have generally, if not always, succeeded to some appreciable cause. Improper indulgence in eating and drinking has been the most common precursor of these diseased conditions of the coats of the stomach. The free use of ardent spirits, wine, beer, or any other intoxicating liquor, when continued for some days, has invariably produced these morbid changes. Eating voraciously or to excess; swallowing food coarsely masticated, or too fast; the introduction of solid pieces of meat, suspended by cords, into the stomach—almost invariably produce similar effects, if repeated a number of times in close succession.”

Eating between the regular hours for taking food, is also an extensive cause of indigestion. The stomach, like other organs of the body, requires its periods of repose, and when deprived of them, it soon becomes deranged. And I have not the least doubt, but the habit of taking frequent luncheons has done more to derange the digestive organs than almost any other. A morbid appetite is thus created, the stomach is deranged, and its healthy tone finally destroyed. A small quantity of food, even a single cracker, is sufficient, an hour before dinner, to destroy the appetite for that meal; and consequently the food must be forced down, or perhaps taken an hour later than usual; the result is, however, the same—derangement and imperfection of the process of digestion. This is not all; the habit of taking food between meals is induced and confirmed, and all its evils entailed upon its wretched victim.

Many individuals have an idea that they should always eat whenever they experience a sensation of

hunger; but the experiment of a few weeks' irregularity will convince them that they entertain most erroneous views. Those, particularly, who are already suffering from derangement of the digestive organs, are frequently tormented with a morbid appetite, which is seldom appeased by crowding the stomach with food. The following case, extracted from Tieknor's "Philosophy of Living," will illustrate our meaning. It is a common case, and one that frequently comes under the eye of the physician, and one, too, that can be cured only by a rigid observance of the physiological law that governs in this case:

"Mr. —, aged forty-six, had complained two or three years of dyspepsia. He had, from his childhood, been in the habit of indulging in luncheons as often as whim or fancy prompted; and at this time he was paying the penalty of his early errors. He described himself now as suffering from a sensation of *emptiness*, and faintness at the stomach, accompanied with an insatiable appetite. His general practice was to rise an hour or more before breakfast, and during that time to pay at least one visit to the kitchen or pantry: at breakfast he was not lacking in the due performance of his trencher operations; and in the interval between breakfast and dinner, he never failed to take at least two luncheons, by way of sustaining his strength and removing faintness—and not unfrequently the demands of his appetite were so peremptory that he was compelled to take a second breakfast with the servants. The dinner, provided it were good, was by no means passed by with contempt; and the poor man's stomach did,

in no case, fail to be *refreshed* with an extra allowance before the hour of tea; and from tea till bedtime, it was not seldom treated with dainties at a cake-shop—and all the while complaining of hunger. After much persuasion, with the help of both reason and ridicule, he was induced to abandon the habit of taking luncheon. In a few weeks his stomach regained its healthy tone, his appetite became natural, and his comfort and health many fold increased.”

There are certain things upon which the gastric juice has no power: the husk of seeds and the rinds of many fruits. Who has not observed that dry currants, and the pips of apples swallowed entire, reappear unchanged among the egests? Whatever passes the stomach unchanged by the gastric juice, passes undissolved through the whole of the alimentary canal, provoking disorder in its transit; forming sometimes a nucleus for intestinal concretions. Indigestible sustenances of all kinds are unfit for weak stomachs, and should be carefully avoided.

Various conditions of the mind have a powerful influence on the digestive organs. Anger and grief will suspend their action almost immediately. And if food be taken just before a paroxysm of anger, in many cases it will produce vomiting and abdominal pains. If an individual would enjoy good digestion, he should always cultivate a serene and cheerful frame of mind.

VIII.

Absorption and Secretion.

WONDERFUL and extraordinary changes are continually going on in the bodies of all animals, by the removal of particles of worn out matter, and the deposition of new ones in their place. These changes are effected by *absorption* and *secretion*, operations which are continually going on insensibly, and at least in adult animals, are, in the state of health, so nicely balanced that no alteration in form or structure is observed. That these changes are going on, is proved by many facts. And in the first place, if portions of the body were not being carried off hourly, it is reasonable to infer that the quantity or supply of aliment taken, after the body has attained its maturity, would add to its bulk, and the increase in size would in many cases be enormous. And we observe further, in the second place, that when aliment is not supplied, as during starvation or diseases which impair the functions of nutrition, the body soon begins to waste away—a result which can be due only to the removal of portions of its constituent elements.

The organs principally concerned in the function

or agency of absorption, are the *lymphatic vessels*. They are found in the texture of nearly all the organs of the body. They very much resemble in anatomical structure, as they also do in function, the lacteals or milk-bearers, described in the chapter on the functions of digestion, and they are both included by anatomists under the head of the *absorbent system*—and they have this in common, that being traced from their extreme branches to their ultimate destination, are found to empty their contents into large veins near the heart, and thus mingle with the venous blood and furnish it with one of its most important elements. The chyle and lymph also differ but little in their chemical constituents.

The absorbent vessels have been divided into two great divisions, founded upon the functions which they perform: “1. *External absorption*, or the *absorption of composition*, which obtains from without the organs the materials intended for their composition; and 2. *Internal absorption*, or the *absorption of decomposition*, which takes up from the organs the materials that have to be replaced by the exhalants.

“By external absorption is meant not only that which takes place at the external surface of the body, but also that of the mucous membranes of the digestive and respiratory passages. Hence again, the division of external absorption into *intestinal* or *digestive*, and *pulmonary* or *respiratory*.

“Internal absorption is also subdivided into—1. *Molecular* or *interstitial*, *nutritive*, *organic* or *decomposing*, which takes up from each organ the ma-

terials that constitute it, so that the decomposition is always in equilibrio with the deposition. 2. The *absorption of excrementitial secreted fluids*, such as the fluid of serous membranes, synovia, &c. 3. The *absorption of a part of the excrementitial fluids*, as they pass over the excretory passages.

“Absorption does not effect the decomposition of the body immediately. It merely prepares the fluid which is to be eliminated by the secretory organs.”*

Lymph is a pale yellow, or colorless, clear fluid, which, under the microscope, appears to contain transparent globules. According to recent chemical analyses, it is found to be composed of the following constituents :

Water,	-	-	-	-	-	-	-	-	-	95.536
Albumen,	-	-	-	-	-	-	-	-	-	1.200
Fibrine,	-	-	-	-	-	-	-	-	-	.120
Animal matter, &c.	-	-	-	-	-	-	-	-	-	.390
Salts,	-	-	-	-	-	-	-	-	-	.585

Its odor is spermatic; soluble in water—the solution becoming turbid, when mixed with alcohol. When left to itself, it coagulates. It thus appears to be strictly analogous to the fluid part of the blood; and indeed, some writers regard the blood as being nothing else than the lymph, with red disks suspended in it. Now, as we see that this lymph is again mingled with the blood in the circulation, it is obvious that it must be of some use to the system; and in fact, it is quite reasonable to infer, that the lymph is nothing more than the fluid part of

* Dunglison's Medical Dictionary, p. 38.

the blood, returning toward the heart, after having deposited its red disks and other constituents in the tissues of the body.

We thus see a wonderful process going on in our systems, by which a substance which is unessential to the perfection of the tissues of the body is removed from them; but being still applicable to useful purposes in the economy, it is retained within the body, and is again mingled with the blood, from which it appears originally to have been derived.

But we have another function to contemplate, which is no less important to the system than the one just reviewed. It is that of *secretion*, by which certain other matters, which are not only unessential but positively noxious to the tissues, are thrown off from them and expelled from the body by means of *excretion*. The literal meaning of the word secretion is *separation*; and this is nearly its true acceptance, as used by writers on physiology. The function of secretion is performed by certain bodies called *glands*, and frequently, also, it takes place from membranes; but whatever form the secreting organ may assume, it consists essentially of a free surface, on which a fine network of innumerable small capillaries can be observed. These vessels have no open mouths, but their coats are very thin, so that they probably permit fluids to transude through them. The fluids secreted by different organs vary remarkably in their nature and composition; and it is one of the great secrets of nature which has not yet been solved, why it is that the particular substances which pass off with the secre-

tions should be formed in certain organs only, and not by all indifferently. We will now give a brief description of some of the secretions.

We will first notice the *bile*. This is a secretion of the liver, which was noticed under the head of digestion, and is a yellow, greenish, viscid, bitter, and nauseous fluid. There exists much discrepancy of opinion among chemists, in regard to the proximate principles of the biliary secretion; a large number of analyses having been made, amongst the results of which there is a great want of conformity. The following table, by Berzelius, approximates as near the truth as any I am acquainted with :

Water,	-	-	-	-	-	-	-	-	90.44
Biliary matter,	-	-	-	-	-	-	-	-	8.00
Mucus,	-	-	-	-	-	-	-	-	.80
Alkali, (in combination with fatty acids,)	-								.41
Chloride of sodium,	-	-	-	-	-	-	-	-	.74
Phosphates and sulphates of soda and lime,	-								.11

The bile undoubtedly plays an important part in digestion, but a large portion of it is excrementitious, destined to be at once carried out of the system by the intestinal canal, although another portion is to be reabsorbed, for the purpose (it would seem) of being ultimately carried off by the respiratory process. The portion carried off by the intestines includes the whole of the coloring matter, the presence of which is readily detected in the fæces. That by the lungs is the fatty portion, no distinct indications of which can be generally found in the fæces, unless they have rapidly passed through the alimentary canal. But in some conditions of the

system, the fæces may contain a very large quantity of bile, the presence of which, almost unchanged, may be recognized in the evacuations in some forms of bowel complaint. Thus we see that the bile may be a completely excrementitious product; and the idea of the action of the liver, as one of the great purifiers of the body from the result of its rûfe matter, is not at all invalidated by the observation that a large part of the secretion is destined for immediate reabsorption. I think it is a clear indication that this secretion is especially intended to eliminate from the blood its superfluous hydro-carbon — whether this have been absorbed from the aliment, or have been taken up by the blood as effete matter, during the course of its circulation.

The second secretion that we would notice is the *urine*. This function is performed by the *kidneys*. Urine is secreted by the cortical part of the kidney, filtered through the tubular portion, poured from the apices of the tubular papillæ into the pelvis of the kidney, and transmitted by it to the ureters, which convey it slowly, but in a continuous manner, into the bladder, where it remains deposited until its accumulation excites a desire to void it. Urine is transparent, of a citron-yellow color, of a peculiar odor, and of an acid, saline, and slightly bitter taste. The following table expresses its constituent parts, according to the analysis of Simon :

[illegible]

The function performed by the kidneys is quite as important as that of the liver. Their function, however, only consists in separating from the blood certain effete substances, which are to be thrown off from it, and has no direct connection with any of the nutritive operations concerned in the introduction of aliment into the system. That this secretion is injurious if retained in the system, is proved by the fact, that in animals whose kidneys have been extirpated, or in case of disease, where the secreting function of these organs is arrested, death very soon ensues, preceded by a remarkable state of insensibility closely resembling poisoning by narcotic substances. But, besides separating this poison from the system, the urine is also a channel for getting rid of the watery parts of the fluids. In this respect it is vicarious with the perspiration, which we will now briefly notice.

The *perspiration* is secreted by the skin, and the object of this function seems to be chiefly to throw off superfluous watery particles from the system. The perspiration is continually passing off from our bodies in the form of a fine invisible vapor, but when it is augmented in quantity, it collects in fluid drops on the surface. These two forms of perspiration do not differ essentially in quality, but they have received different names. The first is called *insensible*, and the second, *sensible perspiration*. One of the most important purposes of this secretion appears to be to keep the body cool by the constant evaporation from the surface. It is on this supposition that we can explain the remarkable fact, that human beings can exist in dry air heated considerably beyond the boiling point of water, without

having the temperature of their bodies raised more than four or five degrees of the thermometer.

“Many instances are on record,” says Dr. Carpenter, “of a heat of from 250° to 280° being endured in a dry air for a considerable length of time, even by persons unaccustomed to a particular high temperature; and persons whose occupations are such as require it, can sustain a much higher degree of heat, though not perhaps for any long period. The workmen of the late Sir F. Chantrey have been accustomed to enter a furnace in which his moulds were dried, whilst the floor was red-hot, and a thermometer in the air stood at 350° ; and Chabert, the ‘fire-king,’ was in the habit of entering an oven whose temperature was from 450° to 600° . It is possible that these feats may be easily matched by workmen who are habitually exposed to high temperatures. * * * In all these instances, the dryness of the air facilitates the rapidity of the vaporization of the fluid, of which the heat occasions the secretion by the cutaneous glands; and the large amount of heat which becomes latent in the process, is for the most part withdrawn from the body, the temperature of which is thus kept down.”*

The quantity of perspiration secreted by the skin is sometimes very great, amounting to several pounds in the course of twenty-four hours. In the summer season, when heat is high, the sensible perspiration goes on very rapidly. In winter, particularly in the North, the secretion is checked in a measure, and although it always exists in some

* Human Physiology, page 671.

quantity under the form of insensible perspiration, it is only just sufficient to keep the skin moist, pliable and elastic. There is also a great deal of morbid matter carried off by the skin, hence we see fever, rheumatism, pleurisy, and a great many other diseases, produced by a sudden suppression of this secretion.* And in treating fevers, how speedily is the patient relieved, when the physician can produce a good action of the cutaneous surface! How important then that we attend to this function, by keeping the surface of the body free from all impurities, that the pores of the skin may be kept constantly open, and the perspiration be allowed at all times to have uninterrupted egress. A thorough ablution of the body, *every day*, is almost as necessary to uninterrupted health as food is to life.

* The *perspiratory secretion* contains lactic acid and lactates of soda and ammonia, which probably proceed from the transformation or decay of the textures, particularly the muscular, which the recent researches of Liebig have shown to contain a preponderance of this acid. Hence, these products abound during great muscular exertion; and when perspiration is checked by external cold, they may be retained in the blood, causing rheumatism, urinary disorders, or various cutaneous diseases. The very serious effects sometimes resulting from sudden cold on the perspiring body may be partly owing to the same cause, as well as to the disorder produced in the circulation.—*Williams' Principles of Medicine*, page 128.

I X.

The Gastric Juice.

THIS fluid is secreted from the mucous membrane of the stomach, In appearance it is not unlike saliva; it is, however, distinctly acid to the taste; and chemical analysis shows that it contains a considerable proportion of free hydro-chloric or muriatic acid, and also some acetic acid. It also contains muriates and phosphates, soda, magnesia, and lime. It possesses the power of coagulating albumen in an eminent degree; it is powerfully antiseptic, checking the putrefaction of meat; and it is effectually restorative of healthy action, when applied to old fetid sores and foul ulcerating surfaces. It will keep for many months, without becoming fetid, if excluded from the air.

Much light has, within a few years past, been thrown upon the nature of this secretion, and the action of the stomach in digestion, by Dr. Beaumont, in his experiments upon Alexis St. Martin, and M. Bernard upon some of the inferior animals. Dr. Beaumont was a surgeon of the United States army, and St. Martin was a soldier in the army, who had his side so badly wounded in battle, as to leave, on recovery, an external fistulous aperture into the cav-

ity of the stomach, through which Dr. B. performed many curious and important experiments.

We will now endeavor to give a condensed account of some of Dr. B's. observations and experiments. "The inner coat of the stomach, in its natural and healthy state, is of a light or pale pink color, varying in its hues according to its full or empty state. It is of a soft or velvet-like appearance, and is constantly covered with a very thin, transparent, viscid mucus, lining the whole interior of the organ. By applying aliment or other irritants to the internal coat of the stomach, and observing the effect through a magnifying-glass, innumerable lucid points, and very fine nervous or vascular papillæ, can be seen arising from the villous membrane, and protruding through the mucous coat, from which distils a pure, limpid, colorless, slightly viscid fluid. The fluid thus excited is invariably distinctly acid. The mucus of the stomach is less fluid, more viscid or albuminous, semi-opaque, sometimes a little saltish, and does not possess the slightest character of acidity. The gastric fluid never appears to accumulate in the cavity of the stomach, while fasting; and is seldom, if ever, discharged from its proper secreting vessels, excepting when excited by its natural stimulus of aliment, mechanical irritation of tubes, or other excitants. When aliment is received, the juice is given out in exact proportion to its requirements for solution, except when more food has been taken than is necessary for the wants of the system."

From the experiments of Dr. Beaumont, it appears that the quantity of gastric juice secreted by the wall of the stomach depends rather upon the general re-

quirements of the system than upon the quantity of food introduced into the digestive cavity, and is a principle of the highest practical importance. "When the juice has become saturated," he says, "it refuses to dissolve more; and if an excess of food has been taken, the residue remains in the stomach, or passes into the bowels in a crude state, and becomes a source of nervous irritation, pain, and disease, for a long time."

"In diseases or partial derangement of the healthy function, the mucous membrane presents various and essentially different appearances. In febrile conditions of the system, occasioned by whatever cause—obstructed perspiration, undue excitement by stimulating liquors, overloading the stomach with food; fear, anger, or whatever depresses or disturbs the nervous system—the villous coat becomes sometimes red and dry, at other times pale and moist, and loses its smooth and healthy appearance; the secretions become vitiated, greatly diminished, or even suppressed; the coat of mucus scarcely perceptible, the follicles flat and flaccid, with secretions insufficient to prevent the papillæ from irritation. There are sometimes found, on the internal coat of the stomach, eruptions of deep-red pimples, not numerous, but distributed here and there upon the villous membrane, rising above the surface of the mucous coat. These are at first sharp-pointed, and red, but frequently become filled with white purulent matter. At other times, irregular, circumscribed red patches, varying in size and extent from half an inch to an inch and a half in circumference, are found on the internal coat. These appear to be the effects of con-

gestion in the minute blood vessels of the stomach. There are also seen at times small apthous crusts, in connection with these red patches. Abrasion of the lining membrane, like the rolling up of the mucous coat into small shreds or strings, leaving the papillæ bare for an indefinite space, is not an uncommon appearance. These diseased appearances, when very slight, do not always affect essentially the gastric apparatus. When considerable, and particularly when there are corresponding symptoms of disease—as dryness of the mouth, thirst, accelerated pulse, &c.—*no gastric juice can be extracted by the alimentary stimulus.* Drinks are immediately absorbed, or otherwise disposed of; but food taken in this condition of the stomach, remains undigested for twenty-four or forty-eight hours, or more, increasing the derangement of the alimentary canal, and aggravating the general symptoms of disease. After excessive eating or drinking, chymification is retarded; and though the appetite be not always impaired at first, the fluids become acrid and sharp, excoriating the edges of the aperture, and almost invariably producing apthous patches, and the other indications of a diseased state of the internal membrane. Vitiating bile is also found in the stomach under these circumstances, and flocculi of mucus are more abundant than in health. Whenever this morbid condition of the stomach occurs, with the usual accompanying symptoms of disease, there is generally a corresponding appearance of the tongue. When a healthy state of the stomach is restored, the tongue invariably becomes clean.”

The gastric fluid, when taken from the stomach, was found by Dr. Beaumont to possess the power of

dissolving various kinds of alimentary substances, when they were submitted to its action at a constant temperature of 100° (which is about that of the stomach,) and were frequently agitated. The solution appeared to be in all respects as perfect as that which naturally takes place in the stomach, but required a longer time. The following is one of many experiments recorded by Dr. B.:

“At $11\frac{1}{2}$, A. M., after having kept the lad fasting for seventeen hours, I introduced a gum-elastic tube, and drew off one ounce of pure gastric liquor, unmixed with any other matter, except a small proportion of mucus, into a three ounce vial; I then took a solid piece of boiled recently-salted beef, weighing three drachms, and put it into the liquor in the vial; corked the vial tight, and placed it in a saucepan filled with water, raised to the temperature of 100° , kept at that point on a nicely-regulated sand bath. In *forty* minutes, digestion had distinctly commenced over the surface of the meat. In *fifty* minutes, the fluid had become quite opaque and cloudy, the external texture began to separate and became loose. In *sixty* minutes, chyme began to form. At 1 o'clock, P. M. (digestion having progressed with the same regularity as in the last half hour,) the cellular texture seemed to be entirely destroyed, leaving the muscular fibres loose and unconnected, floating about in fine, small shreds, very tender and soft. At 5 o'clock, the muscular fibres were nearly all digested, a few fibres only remaining. At 7 o'clock, the muscular texture was completely broken down, and only a few of the small fibres could be seen floating in the fluid. At 9 o'clock, every part

of the meat was completely digested. The gastric juice, when taken from the stomach, was as clear and transparent as water. The mixture in the vial was now about the color of whey. After standing at rest a few minutes, a fine sediment, of the color of the meat, subsided to the bottom of the vial. A piece of beef, exactly similar to that placed in the vial, was introduced into the stomach, through the aperture, at the same time. At 12 o'clock it was withdrawn, and found to be as little affected by digestion as that in the vial; there was little or no difference in their appearance. It was returned to the stomach; and, on the string being drawn out at 1 o'clock, P. M., the meat was found to be all completely digested and gone. The effect of the gastric juice on the piece of meat suspended in the stomach, was exactly similar to that in the vial, only more rapid after the first half hour, and sooner completed. Digestion commenced on, and was confined to, the surface entirely in both situations. Agitation accelerated the solution in the vial, by removing the coat that was digested on the surface, enveloping the remainder of the meat in the gastric fluid, and giving this fluid access to the undigested portions."* Many variations were made in other experiments; some of which strikingly displayed the effects of thorough mastication, in aiding both natural and artificial digestion.

The attempt was made by Dr. Beaumont to determine the relative digestibility of different articles of diet, by observing the length of time requisite for

* Carpenter's Human Physiology, p. 495.

their solution. But, as he himself points out, the rapidity of digestion varies so greatly, according to the quantity eaten, the nature and amount of the previous exercise, the interval since the preceding meal, the state of health, the condition of the mind, and the nature of the weather, that a much more extended inquiry would be necessary to arrive at results to be depended on. Some important inferences of a general character, however, may be drawn from his inquiries. It seems to be a general rule that the flesh of wild animals is more easy of digestion than that of the domesticated races which approach them most nearly. This may, perhaps, be partly attributed to the small quantity of fatty matter that is mixed up with the flesh of the former, whilst that of the latter is largely pervaded by it. For it appears from Dr. B's. experiments, that the presence in the stomach of any substance which is difficult of digestion, interferes with the solution of food that would otherwise be soon reduced. It seems that, on the whole, beef is more speedily reduced than mutton, and mutton sooner than either veal or pork. Fowls are far from possessing the digestibility that is ordinarily imputed to them; but turkey is, of all kinds of flesh except venison, the most soluble. Dr. B's. experiments further show, that *bulk* is as necessary for healthy digestion as the presence of the nutrient principle itself. This fact has been long known by experience to uncivilized nations. The Kamschatdales, for example, are in the habit of mixing earth or saw-dust with the train-oil, on which alone they are frequently reduced to live. The Veddahs or wild hunters of Ceylon, on

the same principle, mingle the pounded fibres of soft and decayed wood with the honey, on which they feed when meat is not to be had; and one of them being asked the reason of the practice, he replied, "I cannot tell you, but I know that the belly must be filled." It is further shown by Dr. B., that soup and fluid diet are not more readily chymified than solid aliment, and are not alone fit for the support of the system; and this, also, is conformable to the well known results of experience, for a dyspeptic patient will frequently reject chicken-broth, when he can retain solid food or a richer soup. Perhaps, as Dr. A. Combe remarks, the little support gained from fluid diet, is due to the rapid absorption of the watery part of it, so that the really nutritious portion is left in too soft and concentrated a state to excite the healthy action of the stomach. Dr. Beaumont also ascertained that moderate exercise facilitates digestion, though severe and fatiguing exercise retards it. If even moderate exercise be taken *immediately* after a *full* meal, however, it is probably rather injurious than beneficial; but if an hour be permitted to elapse, or if the quantity of food taken have been small, it is of decided benefit. The influence of temperature on the process of solution, is remarkably shown in some of Dr. B's. experiments. He found that the gastric juice had scarcely any influence on the food submitted to it, when the bottle was exposed to the cold air, instead of being kept at a temperature of 100° . He observed on one occasion, that the injection of a single gill of water at 50° into the stomach, sufficed to lower its temperature upward of 30° ; and that its natural heat was

not restored for more than half an hour. Hence the practice of eating ice after dinner, or even of drinking largely of cold fluids, is very prejudicial to digestion.

From the foregoing statements, we may conclude that the process by which the food is dissolved in the gastric fluid is of a purely chemical nature, since it takes place out of the living body as well as in it, —allowance being made for the difference in its physical condition. That the natural process of digestion is imitated, when the food is submitted to the action of the gastric juice in a vial, not only in regard to the disintegration of its particles, but as to the change of character which they are made to undergo, is proved by the fact, that the artificial chyme thus formed exhibits the same changes as the real chyme, when submitted to the action of the bile. The process of digestion, however, may be freely conceded to be vital, in so far as it is dependent upon the agency of a secreted product, which vitality alone (so far at least as we at present know,) can elaborate; and all for which it is here contended is, that when this product is once formed it has an agency upon the alimentary matter, which, though not yet fully understood, is conformable, in all that is known of its operation, to the ordinary laws of chemistry. Thus, digestion is conformable to chemical solution,—*first*, in the assistance which both derive from the minute division of the solids submitted to it;—*secondly*, in the assistance which both derive from the successive addition of small portions of the comminuted solid to the solvent fluid, and from the thorough intermixture of the two by

continual agitation;—*thirdly*, in the limitation of the quantity of food on which a given amount of gastric juice can operate, which is precisely the case with chemical solvents;—*fourthly*, in the assistance which both derive from an elevation of temperature,—the beneficial influence of heat being only limited, in the case of digestion, by its tendency to produce decomposition of the gastric fluid;—*fifthly*, in the different action of the same solvent upon the various solids submitted to it.

“It may be considered a well-established fact, that diluted acids alone have no power of chymifying alimentary substances, although capable of partially dissolving some of them; but that their presence in the gastric fluid is essential to its effectual action. The active agent in the process appears to be an organic compound, to which the name of *pepsin* has been given. The properties of this have been investigated by Wasmann, who first succeeded in obtaining it in an insolated state; his observations were made upon the mucous membrane of the stomach of the pig, which greatly resembles that of man.”

X.

The Different Kinds of Food.

WHATEVER is taken into the stomach, and is there changed by digestion so as to furnish materials for the support and growth of the body, is aliment. Man, by the structure of his digestive organs, is capable of deriving nourishment from both the animal and vegetable kingdom.

Animal food, without doubt, contributes more directly to the nourishment of the body than vegetable. But owing to its putrescence and stimulating nature, it is not suited to form the whole of our aliment; and in fact, if long and exclusively used, it overheats and stimulates the system in such a manner, that exhaustion and debility are sure to ensue.

Those, therefore, who have lived for any great length of time on a diet composed entirely of animal food, become oppressed and indolent; the tone and excitability of their bodies are impaired; they are afflicted with indigestion; the breathing is hurried on the smallest exercise; the gums swell and bleed; the breath is fetid, and the limbs are inactive, stiff and swollen.

On the other hand, vegetables are acescent and less stimulating, and generally of more difficult assimilation than animal food. Hence in certain constitutions, where the system is severely taxed by labor, vegetable food seems insufficient to support the health and strength of the body; consequently, flatulency and acidity of the stomach, muscular and nervous debility, and a long train of mental disorders, are frequently caused by this too sparing diet.

In view of these facts, we are led to infer, that a mixed diet of animal and vegetable food is that which is best suited to the nature of man. The proportions in which they should be used depends upon a variety of circumstances, such as constitutional peculiarities, climate and occupation. But generally speaking, the quantity of vegetable should exceed that of animal.

On examining the writings of physiologists, you will frequently find opinions and assertions respecting the influence of animal and vegetable diet on the human system, quite at variance with truth and observation; and indeed, some have even sought for a support to their systems in the fictions of poetry.

“The use of a purely vegetable diet,” says a distinguished naturalist, “though extolled by ancient and modern philosophers, and even recommended by certain physicians, was never indicated by nature. If man were obliged to abstain totally from flesh, he would not, at least in our climate, either exist or multiply. An entire abstinence from flesh can have no effect but to enfeeble nature.

“To preserve himself in proper plight, man requires not only the use of solid nourishment, but to vary it. To obtain complete vigor, he must choose that species of food which is most agreeable to his constitution; and as he cannot preserve himself in a state of activity but by procuring new sensations, he must give his sensations their full stretch, and eat a variety of meats, to prevent the disgust arising from an uniformity of nourishment.” *

We are told, on the other hand, that in the golden age man was as innocent as the dove; his food was vegetables, and his beverage pure water from the fountain. Finding everywhere abundant subsistence, he felt no anxiety, but

“ * * * * * did good pursue,

Unforced by punishment, unawed by fear,

His words were simple, and his soul sincere.

* * * * *

No walls were yet, nor fence, nor moat, nor mound;

No drum was heard, no trumpet's angry sound;

No swords were forged; but void of care and crime,

The soft creation slept away their time.”

In this condition he lived in peace, both with his own species and the other animals. But he no sooner forgot his native dignity, and sacrificed his liberty to the bonds of society, than war and the iron age succeeded that of gold and peace. Cruelty and an insatiable appetite for flesh and blood were the first fruits of a depraved nature, the corruption of which was completed by the invention of manners, arts and sciences. Either immediately, or

* Buffon's Natural History of Man

remotely, all the physical and moral evils by which individuals are afflicted and society laid waste, arose from these carnivorous practices.

But these representations are neither of them correct. They are contradicted by the only criterion in such questions, and appeal to experience. That animal food renders men more cruel and courageous, is fully disproved by the inhabitants of Northern Europe and Asia, as well as by the Esquimaux, which are the smallest, weakest, and least brave people on the globe, although they live on flesh almost entirely, and that often raw.

Vegetable diet is as little connected with weakness and cowardice as that of animal matter is with physical force and courage. That men have been and can be perfectly nourished, and their bodily and mental capabilities be fully developed in certain climates by a purely vegetable diet, admits of abundant proof from experience. We might refer to the Greeks and Romans, who, in the periods of their greatest simplicity, manliness and bravery, lived exclusively on a plain vegetable diet. And also, the modern Italians, Irish* and Scotch, who are not certainly rendered weaker than the English by their free use of vegetable food.

Again, the representations of the vegetarians respecting the noxious and debilitating effects of animal food, are, on the other hand, the mere offsprings of imagination. We have not the shadow of proof,

* Dr. Durbin, in his Travels, says that there are seven millions of people in Ireland, who never taste animal food from one year's end to another.

unless we admit Ovid's *Metamorphosis* and other poetical compositions, that this state of innocence, of exalted temperance, of entire abstinence from flesh, of perfect peace, ever existed, or that it is more than a fable, designed to convey moral instruction. If the experience of every individual were not sufficient to convince him that the use of animal food is quite consistent with the greatest strength of body and most exalted energy of mind, this truth is proclaimed by the voice of all history.

If the Romans, in their earliest state, employed a simple vegetable diet, their glorious career went on uninterruptedly after they had become more carnivorous. We see them winding their way from a beginning so inconsiderable that it is lost in the obscurity of fable, to the empire of the world; we see them, by the power of intellect, establish that dominion which they had acquired by the sword, producing such composition in poetry, oratory, philosophy and history, as at once to be the admiration of all succeeding ages; we see our own countrymen rivaling them in the arts and arms, exhibiting no less signal bravery in the field and on the ocean, in the halls of congress or at the bar of justice; and displaying in a Washington and Franklin, in a Jay and Marshall, in an Adams, Webster and Clay, in a West and Fulton, no less mental energy. Yet with these proofs before their eyes, men are actually found who would have us believe in the faith of some insulated, exaggerated and misrepresented case, and still more miserable hypothesis, that the development, form and power of the body are im-

paired and lessened, and the intellectual and moral faculties injured and perverted, by animal food.

A good substantial diet of animal and vegetable aliment is necessary at all times to vigorous health. We would, therefore, say to those who are in health, and who wish to remain so, that good blood can only be made of good materials. How absurd the position of the anchorites, that good nutritious blood—the life of the body—may be made of slim and slender fare. We are of the opinion that people should, if they can, live well. The diet should be nutritious, and suited to the state, age and temperament of the party.

Let me now call your attention, for a few moments, to a brief consideration of some of the different articles of food, particularly milk, bread and meat.

MILK.—This is the only aliment which nature has kindly provided for the sustenance of the young of the human family, as well as for a large proportion of all inferior animals. Milk is said by some to be partly a vegetable and partly an animal production, or *vegeto-animal*; while others, again, whose mental optics must be peculiarly constructed, can see in it nothing but of a purely vegetable nature. In herbivorous animals, and in woman when she partakes of no animal food, the milk, as well as the whole body, is, doubtless, of vegetable origin. The blood is significantly termed the *pabulum vitæ*—the food of life; and from it all parts of the body derive their sustenance and growth. From the blood are formed bones, muscles, nerves, tendons, horns, hair, &c. and yet, because the blood of a cow or sheep is formed

from vegetable aliment, no one thinks of calling the one or the other of these animals a *vegetable production*. The question is asked, If the food is vegetable, how can the milk be animal production? Like many other questions, this may be answered by putting another: If the food is purely vegetable, how happens it that the flesh of an animal is not purely *vegetable* also? Speculation and fancy can do but little in settling the question, How, in the process of digestion, vegetable matter becomes *animalized*? Certainly, no one would claim that the milk drawn from a carnivorous animal, one that never tasted a vegetable, was any other than an animal production.

Milk differs greatly in the different animals—that of each species being provided solely for the sustenance of its own young. Cow's differs from human milk in containing a greater proportion of cheese and cream, and less of serum, or the watery part. "The milk of a woman," says Dr. Hooper, "who suckles, living upon vegeto-animal food, never becomes acid, coagulates spontaneously, although exposed for many weeks to the heat of a furnace; but it evaporates gradually in an open vessel, and the last drop continues thin and sweet. The milk of a suckling woman who lives upon vegetable food only, like cow's milk, easily and of its own accord becomes acid, and is acted upon by all coagulating substances, like the milk of animals. Children affected with pain in the bowels, arising from acid, are often cured by giving the nurse animal food."

The advocates of an exclusively vegetable diet, may, perhaps, receive a severe check in their enthusiasm, by learning that animal food is positively

absolutely necessary, and an important precept may be deduced for parents from the foregoing considerations—to substitute no other for the mother's milk, when it can be obtained. Because nature has ordained that infants, and the young of all mammiferous animals, shall derive their subsistence from the mother's breast, it is, therefore, concluded that milk is the most proper diet for man in all ages. But, in coming to this conclusion, it seems to be forgotten that nature has decreed that each species of animals shall live on the milk of its own kind. In accordance with this law, we see that the stomach of an infant cannot digest cow's milk on account of its becoming acid; and we find also that nursing mothers are compelled to live on a mixed diet, to prevent their milk becoming like that of a cow. Thus it is evident, from incontrovertible facts, that there is a glaring impropriety in substituting the food for one animal which nature has designed for another. The impossibility of doing this with impunity, is manifest in mature life, there being many who find it almost impossible to subsist on a milk diet.

Man can undoubtedly live on milk and enjoy health, so long as he is not subject to the exercise and labor incident to the ordinary avocations of life; but that he can enjoy strength and vigor that a more generous diet would give, is alike repugnant to reason and common sense.

BREAD.—There is, probably, no article of food, unless it be milk, that is so universally used, in some form, as *bread*; while the reason for its so common use among almost all people and all nations, is not readily assigned. Bread has constituted a principal

article of diet from a very remote antiquity, though the art of making it has been brought to a great degree of perfection by modern improvement. In the earliest ages, bread was made by simply pounding the grain, and baking it mixed with water; grinding was then substituted for pounding, and the flour was separated from the bran; but it has been reserved for modern chemistry to demonstrate the philosophy of bread-making.

It is admitted on all hands, that the best substance for the process of making bread is the flour of wheat, after it has been properly deprived of its bran. Where other kinds of grain are employed, a certain proportion of wheat flour must be added, in order that the result may possess that lightness and spongy texture, which, if not essential to the character of good bread, are among its most desirable and attractive qualities.

The process of making bread may be divided into two parts, namely, the preparation of the dough and the baking. Dough is produced by the intimate union of flour, water and leaven. The action of the water, as is well known, is merely to moisten the flour; the two substances actually combine together in certain proportions, so that it is only the excess of water above this which is evaporated in the process of baking.

In making dough of wheat flour, the quantity of water which thus unites with the flour is estimated at more than one-third of its weight. The peculiar quality of the water seems to be unimportant, since rain, pump or well water answer equally well. Some bread makers use milk as a substitute for water in

mixing dough; but good and wholesome bread cannot be produced in this way, and milk, in our opinion, should not be used.

The third constituent of dough, leaven, may be obtained from any vegetable substance which has undergone the acetous fermentation; but it is more usual, in baking on a large scale, to employ *barm* or yeast, a ferment which collects on the surface of fermenting beer. When first introduced into use, the latter substance was thought by many to be prejudicial to health. This idea has long since been abandoned, but the comparative advantages of yeast and leaven, in making dough, are still a matter of dispute.

It is a curious fact, that yeast which has been dried, and so kept for a considerable time, will, when moistened with water, again serve for the manufacture of bread as well as the fresh article. Dough properly prepared by the admixture of these articles, requires to be seasoned with a little salt, and is then subjected to the process of kneading, the effect of which is to incorporate the constituents more perfectly, and to render the mass uniform and homogeneous.

After this process, the dough is left to itself, that the rising or fermentation may go on without interruption. The time required for the completion of this process, varies with the temperature to which it is exposed. At that of summer heat (76°), which is as high a temperature as can advantageously be employed, the time required is about five hours. When properly raised, the dough is divided into loaves and transferred to the oven. The degree of heat which is best suited for baking bread is 448° Fahrenheit.

Newly baked bread possesses a peculiar odor and taste, which are lost by keeping.

The chemical changes which take place during the process of making bread, are still but imperfectly explained. The most interesting part, namely, the fermentation, which occurs when the leaven is added, is accompanied by the excitation of carbonic acid gas, which, by separating the particles of dough from each other, produce those cells which give to the bread its spongy texture; and while it renders it specifically lighter, imparts also an increased fitness to be digested and animalized. As a general thing, the more perfectly bread has been *raised*, provided it remains sweet, the lighter and more digestible will it become.

Wheat flour is particularly adapted for the perfection of this process, since the gluten, which enters more largely into its composition than that of any of the farinas, serves by its tenacity to detain the gas, and thus assists in the formation of the cells alluded to. Deprived of its gluten, though it would continue to be highly nutritious, and serve the purpose of many culinary products, its property of making good bread would be wholly destroyed. This is amply confirmed by the numerous and varied experiments which have been made in the manufacture of this important article.

MEAT.—The flesh of animals that live on vegetables is far more nutritive than that of carnivorous animals; and, indeed, the latter is indigestible and unfit for the purpose of nutrition. The flesh of old animals is in general more difficult of digestion than that of the young of the same species. The flesh of

old animals abound in fibrin and osmazome, that principle highly stimulating in its effects, and forming the reddish-brown, sapid and aromatic crust on roast beef, mutton or veal. Beef is frequently made tender and digestible by fattening an old animal as speedily as possible. A great difference is made in the flesh of animals by the kind of vegetable matter upon which they are fed; the hams, for example, obtained from swine fattened in the woods, chiefly on nuts, being far superior to those fed in the ordinary manner.

It is a fact well established by observation, that when animals have undergone great fatigue immediately before death, or have suffered from a lingering death, although their flesh may soon become rigid, it also becomes sooner tender than when they have suddenly been deprived of life when in a state of health. The flesh of hunted animals is, therefore, sooner tender, and speedily spoils, and upon this principle the flesh of the pig is rendered more digestible by the revolting cruelty said to be practiced by the Germans, of whipping the animal to death. It has long been a custom to cause old cocks to fight before they are killed; and the Moors of West Barbary, before they kill the hedge-hog, which is esteemed a princely dish with them, as it was of yore with the Greeks, rub his back against the ground, by holding his feet between two, as men do a saw that saws staves, till it has done squeaking, and then they cut his throat.

The mode of killing for the table differed materially among the ancients, as at the present day. The Greeks strangled their swine, and ate them with

their blood; the Romans thrust a spit red hot through the body, and suffered them to die without bleeding. Decidedly the best mode of slaughtering cattle, according to our taste, is that practiced by the butchers of the Jewish persuasion. The Mosaic law strictly prohibited the eating of blood. The *Talmud* contains a set of regulations regarding the killing of animals. Their method is to cut the throat at once down to the bone, so as to divide the whole of the large vessels of the neck; in this way the blood is discharged quickly and completely, and the meat is so much superior that some Christians will eat none but what has been slaughtered by a Jewish butcher.

“Meat,” says Dr. Williams, “comprises the albuminous, oily and gelatinous principles, besides creatine and other soluble extractive matters, which are probably nutritious. It requires combination with vegetables or bread to make it suitable to the palate and stomach. The object of keeping and cooking meat is to make it so tender as to be easily softened by the gastric juice; and all processes which interfere with, or go beyond this result, render meat less wholesome. Thus salting or pickling, keeping until it becomes tainted, or hardening it by over-cooking or fast boiling, which corrugates and toughens the fibre, are so many means of spoiling the meat for the purposes of digestion, and rendering much of its nutriment unavailable.

“The flesh of young adult animals presents the greatest amount of fibrinous nutriment; that of younger animals contains more gelatine and fat; and that of older age is tough from prevalence of fibrous texture, which being gelatinous are more service-

able for soups. The kinds of animal food vary much in their composition, even when the lean parts are selected. Thus beef and pork contain a larger proportion of fat, mutton somewhat less, veal still less; and in the flesh of fowl, game and white fish, there is only a small amount. This affords an explanation of the fact that the latter articles are the best suited to persons of a weak stomach.

“But the proportion of creatine and colored extractive, doubtless, also, determines the quality of the food; thus the flesh of a hare, which contains much, is more heating than that of chickens, and whiting or sole, which may be taken as the representatives of the mildest form of solid animal nourishment. Soups and broths, when deprived of excess of fat, are very useful articles of auxiliary nourishment in combination with solid food, but they are not substantial enough to supply a meal to a healthy person.

“Eggs and milk, respectively, separate or combined, form light and nutritious articles of diet. They are rendered easier of digestion by being heated to about 180° , by which part of the albumen is slightly coagulated. Both eggs and milk contain a considerable amount of oil, which causes them, when taken too freely, to disagree with persons of bilious habit. So likewise they are prone to speedy decay, and lose much of their wholesome nature even in a day or two. In like manner, fresh butter is an excellent adjunct to bread and vegetable articles, but speedily becomes rancid and loses its salubrious properties.”*

* Williams' Principles of Medicine, page 392.

XI.

Animal Heat: its Nature and Importance.

ONE of the most marked peculiarities of the human body, is its tendency to maintain a certain temperature, which in all regions, except under the torrid zone, is generally higher than that of the surrounding atmosphere. What is the cause of this phenomenon? Does it arise from physical endowments, from any peculiarity of the human organization, or from the effects of human art and contrivance, in affording protection from extremes of heat and cold? Is it, in short, the result of physical constitution, or of reason? I think that both these causes are concerned; that the original source of an attribute, which so strikingly characterizes our species, is to be sought in the properties of the human frame; and that this original power of the bodily fabric is assisted and fully developed by the mental prerogatives of man.

Let us, then, briefly investigate the nature of this wonderful phenomenon, that we may thereby learn some important and useful lessons.

And in the first place, there cannot be the least doubt that the temperature of the external parts and extremities of the body depends upon the mainte-

nance of the circulation of the blood through them. If we obstruct the flow of the blood through the principle arteries of a limb, the first effect which follows is a lowering of its temperature. At the same time there are many circumstances which show that the origin of the heat of the blood is to be traced to the action of respiration. Thus in hybernating animals,—that is, animals which remain during the winter in a torpid state,—where the respiration is always very feeble, it is observed that when they are roused, in proportion as the breathing becomes more frequent and full, the heat of the body is augmented; and in animals which have been decapitated, it has been found that if the action of the breathing is maintained artificially, the cooling of the body is very much retarded; whereas, if the respiration had not some effect in maintaining the heat of the body, the cold air thus introduced into the chest must have accelerated instead of retarded the process of cooling.

Analogy has long led chemists to infer the formation of carbonic acid in breathing must have some connection with animal heat, for it is well known that whenever carbon and oxygen combine to form carbonic acid, as in ordinary combustion, heat is evolved. But it is obvious that if the production of animal heat were due solely to what might be called the combustion of carbon in the lungs, we should have the heat of that part of the body very much higher, and the rest of the body comparatively much colder. Now this is found not to be the case, and hence we infer that we must look to some other point for the production of animal heat. It is a

well established fact, that the carbonic acid given off in breathing is formed, not in the lungs, but in the course of the circulation, and therefore if the combining of carbon with oxygen be the source of the heat, there is reason to believe that its evolution takes place, not in the lungs, but in the capillaries over the whole body.

Again, it appears from many experiments, that the arterial blood has what is called a greater specific heat, that is, has the power of retaining more heat than venous blood. Consequently when the blood in the capillaries passes from the arterial to the venous state, being now unable to retain so much heat, part of it must be evolved; hence the opinion that the evolution of heat in animal bodies takes place, not in the lungs, but in the capillaries. The original production of the heat, however, is still more probable in the combination of carbon and oxygen in the lungs; but as the heat thus generated is immediately absorbed by the arterial blood, and carried by it to be evolved in the capillaries, it does not appear in the lungs in excessive quantities, as we would otherwise expect it to do.

I think every fact on this subject points to the formation of carbonic acid by the union of the oxygen absorbed from the air with carbon set free from the body, as the main source of the evolution of heat within the animal system.

We might add much upon this curious subject, but we prefer making it practical, by offering a few remarks upon the means which mankind adopt to preserve the temperature of their bodies. But in

order to render these intelligible, we must premise a few observations on heat generally.

Heat, or *caloric*, is a material substance, but not possessed of any appreciable weight. It exists in two different states, *free* and *combined*. Free caloric comprehends all the sources of heat which are manifested to our senses—as that which comes from the sun, from the fire, and from heated bodies. Combined caloric exists in a concealed state in all bodies; it is called latent, or hidden caloric, and in this form exists even in ice itself. Individuals who are unaccustomed to investigate the hidden laws of nature, will doubtless find it somewhat difficult to believe that to be a real existence which has never been seen; but yet there is something which causes heat, which produces flame, which is active in the vegetable and animal creation, and which has never been seen by us; though its effects are around us on every side, it is itself invisible.

One of the most remarkable properties of caloric, is its tendency to diffuse itself throughout space, or through every body with which it comes in contact. When any body is heated, that is, when a large quantity of caloric has been introduced into it, the caloric has a tendency to pass off into any other body that is near it; and this diffusion of the heat goes on until both the bodies come to the same temperature. There are two ways in which caloric may pass from any heated matter. It may fly off, as light does, in rays passing through the air, until it meets with some substance which absorbs it; or it may pass away from the heated body, along any substance placed directly in contact with it.

The first of these is called *radiation*, the second is *conduction*, of caloric. Thus when we light a fire in a room, the apartment becomes warm, because rays of heat pass into it by radiation; and if we put the point of the poker into the fire, and keep it there, by-and-by the handle of the poker becomes hot, because heat has passed along the piece of metal by conduction. But heat is not conducted along all substances with equal rapidity. Some substances conduct it very rapidly, others very slowly; and in proportion as they do so, they are termed good or bad conductors of caloric. Thus it is quite obvious, that if a heated body is surrounded by a bad conductor of heat, it will part with its caloric much slower than it would do if surrounded by a good conductor.

Now it is precisely on this principle that mankind proceed in the selection of materials for clothing. The heat of the human body is about 98° , but as the temperature of the air in temperate, and still more in cold climates, is much lower than this, it is evident that in accordance with the laws of diffusion of caloric, the heat of our bodies must have a constant tendency to pass off into the surrounding atmosphere. In order, therefore, to prevent the cooling of the surface which would thus ensue, we surround our bodies with substances which are bad conductors, and which consequently prevent our animal heat from passing away from us.

The materials of which clothing is made are chiefly wool, silk, hair, down, cotton and linen. Of these, wool, from its being a very imperfect conductor of heat, and being at the same time an abundant commodity, is most employed to retain the natural heat of

our bodies, that is for warm clothing. Raw silk, raw cotton, and hair, are as bad conductors as wool, and would therefore be equally warm; but silk and cotton are only used in clothing when woven, and they do not retain the heat so readily, for we may remark that the manner of manufacture has an important effect in modifying the conducting power of the substance; generally speaking, the looser the texture the better it will maintain the temperature of the body; because it only acts in virtue of its non-conducting power, but being in this loose state, it retains among its particles a quantity of warm air in contact with the surface of our bodies.

These facts are well illustrated by what we observe in the lower animals. The woolly fleece of some quadrupeds, the abundant hair of others, the feathers and down of birds, are all designed and arranged by the Divine hand to maintain and preserve their animal heat. Man again, who has the high prerogative of reason, is not furnished by nature with these protections in his own person, but is left to the guidance of his intellect to select from the sources around him the materials which will best serve to retain his animal heat, in whatever proportion the temperature of the climate in which he is placed may render it necessary.

The importance of warm clothing placed next the body, will be readily seen, when we consider the effect of cold upon the system. Whenever a portion of the body parts with its caloric; when, in short, it has become cooled in any way, the blood vessels of the part become constricted, the blood of course is prevented from circulating freely through them.

Now a very large portion of blood in the normal condition of the body circulates through the skin, and it is clear, that if the vessels of the parts become constricted, the blood must pass into it in smaller quantities, and will therefore be obliged to find its way in undue proportions into other parts. Hence, when the surface becomes chilled, we have morbid effects produced in internal organs, just because the blood is, as it were, forced into them in improper quantity, from not being allowed to circulate freely in the superficial part of the body. Hence arise inflammation, catarrhs, sore throat and bowel complaints, which, in the changeable weather of spring and autumn, so frequently require the aid of the physician. The proper preventive of all this, is covering the body with a good non-conductor, which will retain the animal heat and prevent it from passing off into the surrounding atmosphere. The best material for this purpose is good woollen underclothes, which should always be regulated by the peculiarities of the system, the seasons of the year, and the occupation of the individual.

“The lower animals,” says Dr. Williams, in his *Principles of Medicine*, “exhibit many interesting facts showing instinctive or natural provisions for changes in their clothing to suit variations in seasons and weather, from some of which we may derive useful instruction. The change of coat in horses takes place in spring and autumn, and depends much on the character of the season; the thick winter coat being slow to come off in a cold spring, but soon changing in continued warm weather; so likewise cold weather in the autumn accelerates the

thickening of this coat, which in horses left to nature we find abundantly provided *before* the severity of the weather is established. Sheep change their wool only once in the year; but its rapid increase before the winter sets in, and its tardiness in loosening and falling off until June, when all the cold winds of the spring have passed by, afford useful suggestions as to the propriety of anticipating the cold by the protection of dress, and of patiently awaiting its subsidence before we remove that protection. Birds moult their features early in the autumn, at which period the new plumage thickens in down and feathery expansion as the winter sets in. In the spring many of the downy feathers drop off, and are by many tribes appropriated to the lining of their nests; and through the summer the feathers continue to get thinner until the moulting season, when all give place to the new plumage.

“But attentive observation of the phenomena and habits of animals, display to us further means by which the same coat or plumage varies in its protective power with changes of the weather as well as of seasons. Thus cold causes a partial erection of hairs and feathers, which has the effect of increasing the thickness of the covering which they form, and this retaining in its interstices a layer of warm air, increases its non-conducting and protective power. On the other hand, warmth occasions hairs and plumage to lie close and smooth, so that they form a covering which is thinner, and more readily permits the escape of heat.

“The preceding facts are not devoid of instruction in regard to the dress of human beings, who should

learn to cover their nakedness under the influence and guidance of experience and reason, which may be better or worse than instinct, according to whether they are well or ill exercised. It argues little for the boasted superiority of man's reason, if it does not guide him to means more effectual in resisting the hurtful action of external temperature than those instinctively possessed by the lower animals; and yet there can be little doubt that none of these suffer from cold, wet and atmospheric changes, to the degree in which human beings do. In truth, reason and common sense are too frequently set aside by foolish habits originating in vanity, fashion, caprice, prejudice, indolence, ignorance, or some evil influence, and disease and infirmity are the penalties incurred by folly."

XII.

Bathing: its Use in Health.

THERE IS nothing in which the domestic economy of the moderns more differs from that of the ancients, than in the article of baths. The allusions of the Bible to this practice, are familiar to us all. The Egyptians, the Greeks and the Romans, agreed in making it a part of their daily routine. The public baths of the Romans were magnificent structures. Those of Caracalla were adorned with two hundred pillars, and furnished with sixteen hundred seats of marble, on which three thousand persons could be accommodated at once. Those of Diocletian were still more sumptuous. Alexander Severus, to gratify the passion for bathing, ordered the warm baths to be opened by break of day, and also supplied the lamps with oil. Thus the bath became a universal luxury, until there were some so devoted to the enjoyment as to use it four, five, and even eight times a day.

In modern Europe, though bathing is not so highly prized as it was among the ancients, it is regarded as far more necessary to health and comfort than among ourselves. Indeed, the neglect of thorough

ablution is not unlikely to become a national reproach. A British traveler says, and not without some appearance of truth, that "the practice of travelers washing at the door, or in the porticoes, or at the wells of taverns and hotels, once a day, is most prejudicial to health; the ablution of the body, which ought never to be neglected, *at least twice a day*, in a hot climate, being altogether inconsistent with it. In fact," he adds, "I have found it more difficult, in traveling in the United States, to procure a liberal supply of water at all times of the day and night in my bedchamber, than to obtain any other necessary. A supply for washing the hands and face, once a day, seems all that is thought requisite."* Though the traveler's censure applies with its full force to some parts of his own country, we may take a useful hint, and amend our ways.

The two great considerations which recommend the bath, are its influence, first, on cleanliness, and next, on health; and the latter is in a great degree dependent on the former. "Cleanliness," as John Wesley is reported to have said, "is the next thing to godliness;" and such is the connection between outward and inward purity, that in all religions the one has been the symbol of the other. Of course, those who work hard and perspire copiously, have more need of care in this particular than others. To the artisan, therefore, the bath is a double advantage, a double luxury. All trades, however, are not alike. There are some in which the operative cannot pretend to be clean, while he

* Stuart's *Three Years in America*, vol. ii. p. 440.

is actually employed; to attempt it would be affectation; but there is the more reason why he should enjoy the feeling of perfect cleanliness when work is over. The watchmaker or the trimmer may be almost as neat as a lady, but there are none who are entirely exempt from the need of water. Some there are who are scarcely aware of the extent to which their skin has become clogged by the successive perspirations and depositions of years. They might form some idea of the fact if they should scrape the surface with a dull knife, by which the accumulated outer skin would come off in a scurf of branny powder. It is too common with certain persons to wash only for the public, and to cleanse only what is visible.

If we were brought up in proper notions on this subject, and knew when we were comfortable, we should feel as much necessity for water to our bodies as to our faces; and a bathing-house, or at least a bathing-tub, would be as indispensable as a wash-basin. An eminent German physician, Hufeland, tells us, that "every Sunday evening people formerly went in procession through the streets, beating on basins, to remind the laborers of bathing; and the tradesman, who labored at dirty work, washed off in the bath that dirt which now adheres to him during a long life." Only he who has made the experiment can know how delicious is the feeling produced by a thorough warm ablution, after a day of heat and exertion. "To wash one's self," says one of our own eminent medical authorities, "ought to have a much more extended meaning than people generally attach to the words. It should not consist

merely in washing the hands, and rubbing a wet towel over the face, and sometimes the neck; the ablution ought to extend over the entire surface, and it is particularly necessary where often least thought of, as at the bends of the limbs, &c. In a tepid bath, with the aid of a little soap and a sponge or brush, the process may be completely performed—with a feeling of comfort at the moment, and of much pleasure afterward.” *

If bathing affords so much comfort, it conduces not less to health. No man can be in health, whose skin is out of order. This is beginning to be acknowledged by all who think and write upon the human system. It is the skin which is the seat of perspiration, of which about thirty-three ounces pass through every twenty-four hours, even when there is no visible moisture on the surface. The skin is the regulator of animal heat; it is a great absorbent, and takes in again much of the corrupt matter left in contact with it by want of cleanliness. It is in close connection with almost every important function of the system. A glance at these facts will show that it requires daily attention. But some will be surprised to learn further, that this wonderful covering has other no less important offices. It not only lets out liquid, but it takes in airs, as well as watery vapor; so that it may almost be said to play the part of the lungs, by secreting and absorbing the same gases. In some animals, indeed, as in the

* Dr. John Bell, on Baths and Mineral Waters; a learned and judicious work, to which I am indebted for most that is valuable in this essay.

leech, all the breathing is done by the skin, and you may kill a frog as effectually by varnishing him all over, as by tearing out his lungs. The filthy covering of an unwashed person is not unlike such a varnish, and he who never bathes labors under a sort of half-suffocation. The outer scurf which we may scrape away is a deposition from the true or inner skin. A good washing and rubbing softens this outer skin, and makes it easy to rub off the dead parts with a brush or hard towel. In this respect, all baths, of whatever temperature, are useful. The surface is cleansed and freed from obstructions, and a way is cleared for the passage of the proper fluids and gases. On a subject so important, I trust these little details will not be thought either dry or unnecessary.

The cold bath is the most natural, and the most easily taken, but it is not always proper or safe. There are some, I know, who recommend it indiscriminately to all persons, at all seasons; but such is not the counsel of wise physicians. "In proportion," says Dr. Combe, "as cold bathing is influential in the restoration of health when judiciously used, it is hurtful when resorted to without discrimination." "Many persons," says Dr. Bell, "in even vigorous health, cannot tolerate the cold bath for the shortest period, still less can they habitually use it with benefit. Even they who have accustomed themselves to it are in danger from the practice, if it be continued after any sudden diminution of vital energy, by whatever cause produced." The same learned author rejects the vulgar notion that cold bathing is either a tonic or a stimulant, and teaches

us that what some are pleased to consider a *reaction* after the application of cold, is no such thing, and that the skin is not actually warmer at this time than before. He therefore comes to the same conclusion with the great ancient Galen, that the cold bath is proper for persons in perfect health, and for fleshy ones, for the temperate and those who use due exercise; that the proper season for it is summer, and that one must be gradually accustomed to it. But neither he nor the most timid adviser would debar the manly swimmer from plunging into the stream, or still better, from indulging in that exquisite refreshment, the dash of the surf upon the sea-shore.

Both the eminent physicians whom I have quoted, recommend for habitual use the tepid or warm bath. Nothing can savor more of ignorance, or be less agreeable to experience, than the notion of some, that the warm bath is enfeebling. Darwin reminds us, that the words *relaxing* and *bracing*, which are generally used in relation to warm and cold baths, are mechanical terms, properly applied to drums or strings; but are only metaphors, when applied to this subject. After a long day's work the warm bath is a thousand-fold better than strong liquors. Bruce, in his *Travels in Abyssinia*, tells us that when he felt an intolerable inward heat, and was so exhausted as to be ready to faint, he was made as fresh and strong by a warm bath as on his rising in the morning. "Some persons may tell me," says he, "that the heat of the bath must weaken and enervate, but I can assure them that the reverse is the case." Count Rumford once repaired to Harrow-

gate, in a feeble state of health. Such was his fear of taking cold from the warm bath, that he used it only once in three days, for less than fifteen minutes, and always went from it to a warm bed. Finding this unprofitable, he reversed his method, and bathed every day at two o'clock, for half an hour, at ninety-six and ninety-seven degrees of Fahrenheit, for thirty-five days together. "The salutary effects of this experiment," he adds, "were perfectly evident to all those who were present, and saw the progress of it; and the advantages I received from it have been permanent. The good state of health which I have since enjoyed, I attribute to it entirely." The same philosopher exposes the mistake of those who avoid the warm bath for fear of catching cold; as, indeed, one has no more occasion to dread catching cold after having been in a warm bath, than from going out of doors into the air of a frosty morning. "There are few," says Dr. Combe, "who do not derive evident advantage from the regular use of the tepid bath, and still fewer who are hurt by it."

By a tepid or warm bath, we are to understand that in which the temperature ranges from seventy-five to ninety-five degrees of Fahrenheit's thermometer. Now this, so far from heating and irritating the body, has a most soothing and tranquilizing effect. This is more especially obtained by a bath at from ninety to ninety-five Fahrenheit. The pulse, on immersion in it, is rendered slower, and the respiration more equable. If the heat be above ninety-eight degrees, which is the temperature of the living animal body, or as it is called blood heat, the bath becomes a hot one; we may then look for

accelerated pulse, flush cheeks, and after a while a copious perspiration bedewing the head and face.

The most proper time for using the warm as well as every other kind of bath, is when the stomach is empty, and especially an hour or two before dinner. It agrees with many persons, however, very well about three hours after dinner. Many individuals are deterred from taking it at either of the times mentioned by the fear of their taking cold afterward, in consequence of exposure to the open air. The error here proceeds from confounding the effects of overheating and fatigue, after violent exercise, with those produced by the warm bath, whereas they are totally dissimilar. In the former case, the skin is cold and weakened by excessive perspiration, and doubly liable to suffer from reduced atmospheric temperature. In the second, or immersion in warm water, the heat of the system is prevented from escaping, and has rather a tendency to accumulate, so that in fact the living body is, after coming out from this kind of bath, better prepared to resist cold than before. A writer on this subject very properly remarks, "a person has in fact no more occasion to dread catching cold after having been in a warm bath, than he has for going into the open air on a frosty morning after leaving a warm bed."

Most persons are astonished at hearing of the practice of the Russians, who rush out from a vapor bath and jump into the nearest stream of water, or roll themselves in the snow. Now in this case, the impunity with which they expose themselves to the extreme cold is precisely in the ratio of their prior excitation by a hot bath. Were they, immediately

after stripping themselves, to plunge at once into a cold stream, severe cold or inflammation of some of the internal organs would be the consequence.

The more vigorous the frame, and active the circulation of an individual, the lower may be the temperature of the bath. The aged and feeble, and those whose hands and feet are habitually cold, require it to be near the degree of blood heat. The two best criterions to regulate the warmth of the bath, are, that the pulse should be made to beat faster than usual, and that no unpleasant sensation or fullness should be felt about the temples and face. It is said by physiologists that the more immediate causes of old age, seems to reside in the inirritability of the fine parts, or vessels of our system; hence they cease to act, and collapse, or become horny or boney. The warm bath is particularly adapted to prevent these circumstances, by its increasing our irritability, and by moistening and softening the skin, and the extremities of the finer vessels which terminate in it. To those who are past the meridian of life, and have dry skins, and begin to be emaciated, the warm bath, for half an hour twice a week, is eminently serviceable in retarding the advances of age.

“Warm bathing,” says a celebrated physician, “can hardly be sufficiently recommended for its sovereign effects in promoting cleanliness, and consequently for curing all diseases of obstructed perspiration from foul skin. It is much to be lamented that so many children become the victims of their parents’ laziness, and neglect of the most sweet and healthful virtue, *cleanliness*; for if they would devote

a little more of their misspent time and money to the more decent clothing and washing of their children, there could be no doubt that the little innocents would enjoy ten thousand times more comfort than they can have while covered with filth. In fine, having seen the fatal termination of so many diseases, in my opinion easily curable by the bath, I cannot dismiss this important subject without earnestly recommending it to every gentleman to provide for his family the conveniences of bathing, as not only one of the greatest luxuries, but the best preservative of health in a variable climate like that of ours."

XIII.

Exercise: its Physiology and Utility.

THE muscles constitute more than one-half of the bulk of the human body, and consequently, a very large portion of the whole quantity of the blood is devoted to supply them with nourishment. By continued exertions, their energy and materials become rapidly impaired and reduced, and can only be restored by an increased activity in the circulation. The manner in which this is accomplished, will be readily understood by examining the movement of the blood vessels of any of the limbs. Take for example the arm.

By inspecting the arm, you will see that its blood vessels are covered and protected throughout their whole course by the adjacent muscles, which they furnish with blood by their numerous branches. In consequence of this position, the muscles cannot contract without at the same time compressing the blood vessels and propelling their contents forward. The assistance afforded to the circulation of the blood, by this arrangement, is very great, and may be familiarly exemplified in the operation of bleeding.

When the blood stops or flows slowly, it is customary to put a ball or any other hard body into

the hand of the patient, and desire him to squeeze and roll it about. The success of this action depends simply on the muscles of the arm compressing the blood vessels and forcing onward the current of the blood by their successive contractions.

The increased activity of the circulation, thus induced by general muscular action, is not confined to the circulation of the muscular vessels, but the whole frame partakes, and every organ and texture feels its good influence. Not only is the circulation invigorated, but a greater quantity of blood is required to supply the demand; it passes through the lungs more rapidly and in larger quantities, which urges the respiratory organs to more active operations in order to purify the blood with sufficient rapidity; while to supply the demand for quantity of blood, the appetite is excited, more food is eaten, and the digestive organs partake of the excitement. Thus, directly or indirectly, almost every function is impelled to increased activity, and the whole system receives a healthy impulse.

Illustrations of these facts as well as the reverse, may be daily met with, especially in our large towns and cities. We find that those who lead active and even laborious lives are, generally, in possession of good, vigorous constitutions, healthy looks, and frames that will endure an almost incredible amount of labor; while we see others equally well prepared in early age for a state of body so very desirable, but who, by a course of sedentary and inactive pursuits, are thin, pale, without muscular strength, and subject to a variety of diseases. The difference between these two opposite conditions, is justly attributable mainly to the non-employment, in one case, of the muscular

system, and to its regular and continued exercise in the other.

It is a well established fact, that moderate and uniform exercise of individual muscles, will greatly increase their size and strength. This is exemplified in the case of various artisans who have occasion to employ different sets of muscles. With the blacksmith, who is daily in the habit of striking with a heavy hammer or in lifting massive bars of iron, we shall find the muscles of the arms so large as to appear almost deformed from their size, and possessing proportionate strength and hardness, while the muscles of the lower limbs, used for but little else than to keep him in an erect posture, present nothing remarkable. On the contrary, we find the muscles of the legs of the dancing master, which are used to throw his body into a thousand different attitudes, and with great force and rapidity, large and firm, while the muscles of his arm, having but little to do, are small and weak.

To increase the size and strength of a muscle, therefore, to its greatest degree, its exercise must be uniform and not excessive. The intervals of relaxations from labor should be frequent, in order to give the muscles and the nerve opportunity to recruit their powers. It is very easy to propel the action of a set of muscles beyond their strength, a circumstance which every individual has made known to him, when it occurs, by the production of a painful sensation in the organ, called fatigue; and if this occurrence is not regarded, and the muscles are still continued in action without rest, their energies may at last become so far exhausted as to cause unpleasant results, requiring at least a long period

of inaction to recover them, and their contractile power may become permanently impaired. For nearly the same reason, a muscle should never be exerted to excess. One strenuous effort, especially of a muscle unaccustomed to work, will oftentimes exhaust it completely.

Exercise of the muscular system, to be beneficial, ought, in the *first* place, always to be proportioned to the strength of the constitution, and not carried beyond the point, easily discernible by experience, at which waste begins to succeed nutrition, and exhaustion to take the place of strength. And *secondly*, that it ought to be regularly resumed after a sufficient interval of rest, in order to insure the permanence of the healthy impulse given to the vital powers of the muscular system; and in the last place, that it is of the utmost consequence to join with it a mental and nervous stimulus.

Exercise is the natural food of the muscles, upon it they will increase and strengthen; they will be more able to do their required work; the spinal column will then be kept straight; an upright figure and a graceful carriage, but, above all, a free and easily dilated chest, and an exemption from many pulmonary and other complaints, will insure to the individual a happier and a longer life.

“Exercise is life! ’tis the still water faileth;
 Idleness ever despaireth, bewaileth;
 Keep the watch wound, for the dark rust assaileth;
 Flowers droop and die in the stillness of noon.
 Exercise is glorious! the flying cloud lightens;
 Only the waving wing changes and brightens;
 Idle hearts only the dark future frightens;
 Play the sweet keys, wouldst thou keep them in tune.

The following interesting remarks on "Gymnastics as a part of Education," is from the "North American Review." They should be pondered well by all parents and teachers :

"It needs to be rung into the ear of every educator, as with the peal of a trumpet, that the body cannot be neglected with impunity; that in its effeminated capacities the most morbid and monstrous passions will hold their saturnalia; and that only in its vigorous exercise and expansion, as well as in the development, culture and equipment of the intellect, and the enriching and purifying of the heart, can the world have 'assurance of a man.' No school or college with any pretensions to be level with the spirit of the age ought to proceed upon the old system of drugging the intellect to satiety with knowledge, and leaving the physical and moral powers comparatively uncared for, since only as all the capacities are harmoniously unfolded, can any one of them obtain its maximum of strength, usefulness and happiness. The ancient philosophers can yet teach us many a lesson of high wisdom; but they can give us no more significant symbol of the fine balance of their systems than the lovely walks of the gymnasium, the arena of active sports for innumerable youths, musical with the voices of Socrates, Plato and Aristotle.

"Nor is the whim to be tolerated, that nothing will benefit the child in education, or the patient in disease, except what he fancies and likes, and that if bodily exercises are distasteful, they will prove fruitless. The child has many a lesson set to learn against which he relucts, but the very energy called

forth in overcoming his dislike proves a wholesome discipline to his forming character. And the patient must take many a pill which his soul loathes; but what is bitter in the mouth becomes sweet in the stomach, and matures into health in due time. So in this office of the physical man, a walk, a game, a run, a ride, or a feat of strength, may not always accord with our inclinations; and if it does not, it will doubtless be entered into with the less spirit, and result in the less good. But it needs to be known, both by educator and physician, that exercise is good, however distasteful at first—that we cannot stretch out an arm or a foot, or walk, or run, or leap, without freshening the life-currents of the system, sending new flashes of electric warmth along the nerves and muscles, and scattering a cloud of those blue and black devils that buzz around the ears of poor, sedentary students, stayers at home, and women imprisoned in nurseries and amid their household cares. Dryden long ago sung:

‘The first physicians by debauch were made;
Excess began, and Sloth sustains the trade.
By chase our long-lived fathers earned their food;
Toil strung the nerves and purified the blood;
But we, their sons, a pampered race of men,
Are dwindled down to three-score years and ten.
Better to hunt in fields for health unbought,
Than fee the doctor for a nauseous draught.
The wise for cure on exercise depend:
God never made his work for man to mend.’

— “Many a poor, pining invalid needs but to shake himself free from the palsying incubus of imagined inability to move, and to plunge into the open air, heaven’s tonic bath of ether, and as he gets strength

by gentle and judicious repetition, to mount a horse or to practice the gymnastic movements; and a sense of returning health would soon seat itself in every sense and limb. Many a wanderer to distant climes for health has a fountain of hygiene in his own bosom, which needs but the magic wand of the gymnast to unseal it, and he would drink healing and vigor from its sparkling waters. Many a life is worn heavily and wearily away, a burden to the possessor, a sadness to friends, and a drawback from the happiness of society, which requires but the old homely prescription of Galen or Celsus to give it 'beauty for ashes, and the garment of praise for the spirit of heaviness.' Whatever may be thought of the theory of kinesipathy as a mode of treatment for disease, we cannot doubt that the kneading process of vigorous muscular movements, the invigoration of repeated exercises, the deepened inspiration and the quickened perspiration of rapid play with the Indian clubs or the dumb-bells, are the legitimate preventive and cure of a score of diseases. Nothing should be done rashly, or without the consultation and permission of one's physician, but with this proviso the way is clear. The use of drugs and medicines has but a limited range at the most—is an evil invoked to overcome a greater evil—one thief set to catch another. But the beauty and perfection of the gymnastic cure is, that it chimes in with the continued normal state of the body and creates health, while it is itself health.

"We look to see, therefore, the old art redeemed from the foul uses to which it has often been put, and employed in qualifying man to act well his part,

as a body made of the earth, and as a soul destined to immortality. Strength, health, and beauty, are to be quarried out of the rich materials stored away in human nature by a bountiful Creator. The greatest and the best lie near us, and humble herbs grow at our door that can calm the fiercest diseases. There is required but the application of a normal, natural education even to our dyspeptic, deformed and degraded race, to create new wonders of physical grace and vigor, equal to those of the Grecian times, adorned and sanctified by a coronet of Christian virtues never known to the Porch or the Academy."

XIV.

The Passions: their Influence upon the Body.

THE passions of the mind have been considered of two kinds, the depressive and the exciting. Their effects when deranged may be equally injurious to health, though operating in directly different ways. The depressive passions act by prostrating nervous energy, upon which the health and activity of the system depends; while the exciting quicken the action of the blood vessels, and induce diseases of a more inflammatory character. To the first class belong fear, grief, and disappointed hope. To the latter, joy, anger, and vivid imagination.

We will notice, in the first place, the effects of FEAR. Fear springs from an undue action of the phrenological organ of cautiousness. When properly exercised, the individual is circumspect in all his movements, he thinks before he acts, that he may be assured of his safety. When too powerfully exercised, it produces doubts, irresolution and fear.

When fear acts suddenly upon the mind, it causes a variety of painful affections. Its most common effects are fever, fainting, insanity, and a change of

color of the hair. We will give these effects a passing glance.

1st. *Fever*.—It is probably known to most readers, that all pervading epidemics partake more or less of a febril character; and in all epidemics it is well known that the most timid are the soonest to become its victims. A distinguished physician, and one who has traveled much in the eastern part of the world, particularly in Egypt, where the *plague* has been raging for a number of years, informs us that those who were the most apprehensive of contagion, were the soonest to sicken and die; while those were most interested in the patient's recovery, and were about his bed-side administering to his wants, were seldom, if ever, attacked. During the prevalence of an epidemic, every person within its limits is more or less affected with fear, and fear when operating directly on the functions of life, destroys the harmony of their action, impairs their powers of resistance, and consequently leaves the system more susceptible of contagion.

2d. *Fainting* is quite a common effect of fear. It sometimes occurs after the danger feared is past, and not unfrequently before. Some individuals have such horror of blood, that the sight of a lancet or blood will cause them to faint. It is said of the celebrated Dr. Physic, that he could nerve his mind to perform any surgical operation, no matter how fearful and hazardous, yet the moment it was completed he would faint. Some years since I saw a horse run away with a lady; she manifested great calmness and self-possession in managing him, but the moment she succeeded in stopping him she fainted.

3d. *Insanity* is a common effect of fear. George

Groehentine, a Polander, who had enlisted as a soldier in the service of the king of Prussia, deserted during the war. A party was sent in pursuit of him, and when he least suspected it, they surprised him, singing and dancing among a company of peasants who were making merry. This event so sudden and unforeseen, and so dreadful in anticipating the sentence of being shot, struck him in such a manner, that, giving a loud shriek, he became at once a hopeless maniac, and died in a few days.

4th. Fear, when acting suddenly upon the mind, will produce a change of color of the hair. We could adduce many cases to substantiate this assertion, but two or three will suffice:

1. Don Diego Osorus, a Spanish nobleman, being in love with a young lady of the court, had prevailed on her to a private meeting in the king's garden. They had not been there long, before they were betrayed by the barking of a dog, Diego was seized by the guards and thrown into prison; as it was a capital offense, he was condemned to die. He was so terrified at hearing his sentence, that he became gray, as if far stricken in years, which so moved the king's compassion as to obtain his pardon.

2. A captain in the Irish army, who was about to deliver himself up to Lord Broghil, a commander of the English army, agreeable to proclamation to those who would return to their allegiance, was intercepted by a party of English; the governor being absent, the poor fellow became so alarmed lest he might be put to death before he returned, that his hair became white in parts, while others retained their original red color.

3. A boy in one of the rudest parts of the county

of Clare, in Ireland, in order to destroy some eagles lodged in a hole one hundred feet from the summit of a rock which rises four hundred feet perpendicular from the sea, caused himself to be suspended by a rope, with a scimeter in his hand for his defense, should he meet with an attack from the old ones, which precaution was found necessary; for no sooner had his companions lowered him to the nest, than one of the old eagles made at him with great fury, at which he struck, but unfortunately missing his aim, nearly cut through the rope that suspended him. Describing his horrible situation to his comrades, they cautiously and safely drew him up, when it was found that his hair, which a quarter of an hour before was a dark auburn, was changed to gray.

Having thus contemplated some of the effects of fear, we will now notice some of the objects of fear. The objects of fear are of two kinds, reasonable and unreasonable. The objects of reasonable fear are death, surgical operations, &c. Unreasonable, darkness, ghosts, &c.

1st. *Death*.—The contemplation of our mortality, and all those scenes which await us in another world, is calculated to fill the mind with emotions of the most appalling kind. To be separated from all that we hold dear to our hearts, to shut our eyes forever upon the verdant fields of earth, the spangled heavens, and all the splendors of this world, and lie down in silence with the primitive fathers of our race, is, indeed, a subject filled with reasonable fear.

2d. *Surgical Operations*.—A fear of the knife is,

indeed, a reasonable fear; for when we consider the complicated nature of our frames, and the evident danger attending the simplest operation, it will uniformly fill the mind with fear. The dread of an operation frequently operates so powerfully on the mind, as to be itself the cause of death.

3d. *Darkness.* — Fear which is excited by this cause, most generally arises from an improper education in early life. How frequently do we see a bad tempered mother, or school teacher, banishing a child into a dark room for the purpose of punishment, with the positive assurance that if they do not behave themselves better, some frightful monster will come and take them off. The tender mind receiving such appalling impressions, overcomes them with great difficulty. Sir Astley Cooper relates a case which fell under his own observation, which may, perhaps, prove a valuable lesson to those mothers and teachers who are fond of inflicting this mode of punishment. “A child, for some trifling offense, was put by its school mistress into a dark cellar. The child was dreadfully frightened at the idea of being put there, and cried violently the hour that it was confined. When she returned to her parents in the evening, she begged that she might not be put into the cellar; the parents thought this extremely odd, and assured her that there was no danger of their being guilty of so great an act of cruelty; but it was difficult to pacify her, and when put to bed she passed a restless night. On the following day she had a fever, during which she frequently cried, ‘Pray do not put me in the cellar.’ The fourth day she was brought to my house in a

high state of fever, with delirium, frequently muttering, 'Pray do not put me in the cellar;' and when I inquired the reason, I found that the parents had learned the punishment to which she had been subjected. I ordered what I conceived likely to relieve the fever, but the child died in a week after this unfeeling conduct."

4th. *Ghosts*.—I hope it will not be necessary for me at this late day, to enter into a very elaborate discussion to convince any reader that it is unreasonable in the extreme to fear that which never had an existence. All unnatural appearances can be accounted for by known principles of natural science or philosophy. Most of my readers are, without doubt, acquainted with fire-balls, known by the name of "Jack-in-a-lantern," so often seen dancing over swamps. A person actually sees a light, where there is no human being who bears it; and not being acquainted with the chemical principles of inflammable gases and spontaneous combustion, he naturally concludes that it must be some apparition, sent as a warning to himself or the village. Perhaps in a few days some accident occurs, or some neighbor dies, and he feels without a doubt that this luminous matter was sent as a monition. This story is circulated through the whole village. As it passes from house to house, it is receiving constant accessions, and is growing more marvelous and more appalling, till every child is afraid to venture out of doors after night-fall.

The individual who is conversant with natural philosophy, discovers in this appearance no cause of fear, but an interesting natural phenomenon. An

inflammable gas oozes from the ground, and is set on fire by spontaneous combustion.

Again: Every boy is acquainted with light-wood, and yet many a man has fled as though demons were in pursuit of him, because he has seen in a rotten stump the bright light which decayed wood emits. His terrified imagination, aided by the darkness of the night, transformed the stump into a giant, with eyes of fire. He takes safety in flight—when he arrives at his home, breathless and pale, and trembling, to satisfy his hearers that he has had good cause for fear, he declares that the giant called after him, and pursued him, and that he heard the loud clatter of the monster's feet close behind him. The poor stump remains in the field, unconscious of the injury it has done. This light in the decayed wood is produced by a substance called phosphorus. The light which it emits is so pale that it cannot be seen in the day time. "A person with a stick of phosphorus once wrote upon the wall of another's bed-chamber, *this night thou must die.*" When the person entered his room, the light of the lamp prevented his observing the light of the phosphorus, but as soon as the lamp was extinguished, he beheld the warning words glaring from the wall, but he happened to be acquainted with the nature of phosphorus—laughed heartily at the attempted deception, and quietly fell asleep.

GRIEF.—The next passion which we are to contemplate in the course of the depressive passions, is grief. The effects of grief upon the body in many cases resemble those of fear, with however some variations, owing to its being of longer duration.

Grief diminishes the bodily strength in general, and particularly the force of the heart and the circulation. It aggravates the malignity of putrid and contagious distempers, and renders people more apt to receive the infection of them. Blindness, sighing, loss of memory, gray hairs, and premature old age in the countenance, are some of the common effects of an improper indulgence of this passion.

Among the different kinds of grief we will notice the following:

1. That which manifests itself in a profound sleep. We have a striking illustration of this species of grief in the incident of our Saviour in the garden of Gethsemane. We are informed that on the night in which he was betrayed, he and his disciples retired to the above named garden to pray, and that while he prayed his disciples fell asleep. We are told that they slept soundly, and we are also informed that the reason why their slumbers were so profound was in consequence of sorrow having filled their hearts.

2. That kind which manifests itself with great violence and noise. When we see grief manifesting itself in this form we may conclude with great certainty that it will be of short duration, and that ere long the sun of happiness will dispel the murky clouds, and shine with redoubled splendor and glory. I remember having read a story which will illustrate very beautifully the happy termination of this kind of grief. An affectionate widow descended into the tomb of her recently deceased husband, vowing to mourn and starve herself to death. The almost heart-broken widow was watched by one who took an interest in her distress. He followed her into the

tomb, where his sympathy had such an effect upon her that it turned her streams of grief into rivulets of joy, and over the coffin of her dead husband she plighted her vows for another.

3. The third and last kind is that which manifests itself by refusing to take food or sleep. Alexander the Great, after the death of Ephesian, lay three days together upon the ground, with an obstinate resolution to die with him; and would neither eat, drink nor sleep. Such was the excess of his grief that he commanded battlements of houses to be pulled down, mules and horses to have their manes shorn off, some thousands of soldiers to be slain to attend him to the other world, and the whole nation of Casseans to be rooted out.

Much has been written by physicians on the subject of remedies for this distressing passion whenever excited, but as the remedies are mostly of a moral nature, the chief consolation is to be found in the Christian religion. Here we find a balm for every grief and a cure for every wound.

DISAPPOINTED HOPE.—Hope is regarded by many as the sheet-anchor of the soul. It is this which keeps our hearts from bursting under the sorrows and trials of this world; hence some call it the *manna* of heaven, that comforts us in all extremities; others, the honest flatterer that caresses the unhappy with expectations in the bosom of futurity.

Without hope, fame would lure but few to her temple, for it cheers them on. When they are weary, it points them onward; when they slumber, it awakens them; and when mists surround them, and they know not where to tread, it clears them away.

Hope opens the path before them, smooths its ruggedness, lures them onward with its syren song through delightful meadows and groves, and by refreshing waters. When all other things fail us, hope stands by us to the last. Hope gives freedom to the captive, health to the sick, joy to the disconsolate, and wealth to the beggar.

“Hope with goodly prospects feeds the eye,
Shows from a rising ground possessions nigh;
Shortens the distance, or o'erlooks it quite,
So easy is it to travel by the sight.”

That a passion possessing such power as hope, should produce many bodily affections, when disappointed, is by no means strange. How frequently do we see our brightest hopes set in gloom; how often are our best laid plans of worldly bliss nipped in the very bud. The repetition of such disappointments have a tendency to produce many painful and distressing mental and bodily affections. Take, for example, disappointment in regard to love. We sometimes see the most fearful wreck of mind produced by this cause that can be imagined; it is the most powerful, most engrossing of all passions, and when thwarted in its object, its consequences are proportioned to its strength. Mental alienation, or some other disease which proves more suddenly fatal, is its frequent termination; and unrequited or disappointed love is the “worm i' the bud” which blasts all hope, and renders life intolerable and hateful. On the contrary, successful, virtuous love excites feelings of a different character. It produces joyful exhilaration; it makes the rough smooth, and

the crooked straight, and prompts to a life of usefulness, or to deeds of daring and enterprise.

Joy.—This emotion is nearly allied to hope, but it differs from mere pleasure. The latter has only reference to the present, joy always more or less to the future, and hope may be said to be one of its constituents. Joy is therefore pleasure, strengthened by the hope of future happiness. Without this hope, no one can be really joyful, since the prospect of future misfortune would make us unhappy. Joy rests on present pleasure and a smiling future; it is the union of pleasure and hope, of the present and the future. Joy becomes delight when the long-wished for occurrence takes place as we expected, and when, at the same time, a new life arises in our breast, so that care and trouble can gain no hold upon us. In such cases the emotion of joy has often proved fatal; for hopes suddenly realized, while the mind is again drawn powerfully into new future prospects, distract the mind, and, by its connection with the body, causes the entire derangement or destruction of the physical system.

There are many instances upon record of death being induced by a sudden paroxysm of joy. The son of the famous Leibnitz died from this cause, upon his opening an old chest and unexpectedly finding in it a large quantity of gold. A poor mechanic in the city of Baltimore is said to have died from the same cause, by receiving intelligence of a vast fortune being left him in England. Joy, from the successful issue of political schemes or wishes, has often produced the same effect. Pope Leo the Tenth died of joy, in consequence of hearing of a

great calamity that had befallen the French nation. Several persons died from the same, upon witnessing the restoration of Charles the Second to the British throne; and it is well known the door-keeper of Congress died of an apoplexy from joy, upon hearing the news of the capture of Lord Cornwallis and his army, during the revolutionary war.

ANGER.—The passion of anger originates from an abuse of the organ of combativeness. This faculty (combativeness,) is far from being a selfish propensity, as many have attempted to show; for it is naturally excited by injuries offered to others as well as ourselves. This organ was given by the Author of nature, not only to excite us to defend the helpless and innocent, but to raise our minds above the fear of him who seeks to plant the foot of tyranny on our necks, and bind our hands with the cords of oppression. This passion only becomes sinful and injurious when it assumes the form of hatred and revenge.

A morbid paroxysm of anger produces many very distressing and formidable effects. We will cite a few cases to show its nature and effects.

1. Clitus was a person whom Alexander the Great held very dear, as being the son of his nurse, and one who had been educated together with himself. He had saved the life of Alexander at the battle near the river Granicus, and was by him made the prefect of a province; but he could not flatter, and detesting the effeminacy of the Persians, at a feast with the king he spoke with the liberty of a Macedonian. Alexander, transported with anger, slew him with his own hands; though when the paroxysm

was over, he was with difficulty restrained from killing himself for the fault which his sudden fury had excited him to commit.

2. Charles the Sixth, king of France, being highly displeased with the duke of Britain, upon some sinister suspicions, was so bent upon revenge, that unmindful of all other things his passion suffered him not to eat or sleep—he would not hear the duke's ambassadors that came to declare his innocence—but set forth with his forces out of a city of the Cænanans, contrary to the advice of his commanders and physicians, about noon, in a hot sultry day, with a light hat upon his head. He leaped upon his horse, and bade them follow him that loved him. He had scarce gone a mile from the city when he became delirious, and in his frenzy drew his sword, slew some and wounded others that attended him; at length, wearied and spent, he fell from his horse, and was carried back to the city, but his mind was never restored to its former soundness and vigor.

3. Pope Julius the Third, being very fond of peacock meat, commanded one day at dinner that a roasted peacock should be set by for him till supper. At supper he called for it once and again; but being before eaten up by the cooks, it could not be set on the table, whereupon he fell into so violent a passion for this delay, that at length he broke out into this blasphemous speech, that he would have that peacock, *al despetto n' Iddio*; that is, in despite of God: and when those of his attendants that stood about him, intreated he would not be so far moved for so slight a thing as a peacock, he, to de-

fend his former blasphemy by a greater, in a mighty passion, demanded why he, who was so great a lord upon earth, might not be angry for a peacock, when God himself was in such a fury for the only inconsiderable apple eaten in Paradise, that he condemned the whole posterity of the first man to suffer so deeply for it.

4. It is said of Herod, the tetrarch of Judea, that he had so little command over his passions, that upon the very slightest offense his anger would transport him into absolute madness. In such a desperate fit he killed Josippus. There is no difference between a mad man and an angry man while the fit continues, because both are void of reason, and blinded by the impetuosity of their mental emotions. In anger the expression of the countenance is nearly the same as it is in some forms of madness. "The features are unsteady; the eyeballs are seen largely; they roll, and are inflated. The forehead is alternately knit and raised in furrows, by the motion of the eyebrows; the nostrils are inflated to the utmost; the lips are swollen, and being drawn, open the corners of the mouth; the muscles are strongly marked; the whole visage is sometimes pale, sometimes inflated, dark, and almost blind; the words are delivered strongly through the fixed teeth; the hair is fixed on end, like one distracted."

The above is a picture of a person laboring under a powerful paroxysm of this passion; the reader is not, therefore, to look for such marked manifestations to determine the presence of this passion. Some individuals manifest it by a flushed face, spasmodic contraction of the muscles of the arms, coughing, singing, and stamping of the feet.

As anger is a very common passion, it may not be out of place here to suggest a few remedies.

1. This passion may be overcome by opposing it to other faculties of the mind, which produce the contrary effect. For instance, the organ of veneration, when called into operation for this purpose, has, in many cases, proved very salutary. The following case, related by the Rev. C. G. Finney, may be interesting and useful to some of my readers:

“A merchant of my acquaintance was so completely under the control of a passionate temper, and was continually saying things in a moment of anger which did serious injury to himself. It was a cause to him of great perplexity, and I recollect one evening while I was walking with him by his store, some sheep had gathered about some salt barrels left there, and were licking the salt upon them. He flew into a terrible passion, and caught up clubs and stones which he threw at them, with the evident intent to kill them. I was shocked, and rebuked him. He was filled with grief, and declared that he despaired of ever being able to overcome his temper. I asked him to promise me that when he was inclined again to be angry, he would stop and say over in his mind the Lord’s prayer. He said he would. Some years after, he told me that he had always borne this in mind, and that it had acted like a charm; whenever he had been assailed by temptation, he had thought of this prayer, and the very thought of it had dispelled his rising passion.”

2. The cultivation of the understanding has a great influence in destroying the predisposition to anger. Science of all kinds is useful for this purpose, but the study of mathematics possesses this

property in the most eminent degree. It produced this effect upon the temper of Sir Isaac Newton, of which the following instance is mentioned by one of his biographers: Upon seeing a large collection of his papers on fire, that contained the calculation of many years, in consequence of his little dog jumping upon his table and oversetting his candle upon them, he barely uttered the following words, "O, Diamond, Diamond, little dost thou know the mischief thou hast done thy master."

3. Persons that are predisposed to anger, should avoid the use of stimulating drinks. No agent has a more powerful tendency to call forth the latent iniquity of the soul than ardent spirits; and men frequently commit deeds of violence while under its influence, that they could never do without it. A young man who had murdered his father and mother while laboring under a paroxysm of anger, was asked by the magistrate in his examination, how it was possible that he could commit such a revolting crime? He answered, "With the aid of ardent spirits I could commit twenty such crimes."

Again, persons that are subject to an undue excitement of this passion, should bear it constantly in mind that it is not only contrary to religion and morals, but to liberal manners. No person is worthy of the name of Christian or gentleman, who is continually *flying* into a passion for great or little things. The term Christian implies a command of all the passions, and especially the one now under consideration.

VIVID IMAGINATION.

“Lovers and madmen have such seething brains,
Such shaping phantasies that apprehend
More than cool reason ever comprehends.
The lunatic, the lover, and the poet,
Are of imagination all compact.
One sees more devils than vast hell can hold;
This is the madman. The lover, all is frantic,
Sees Helen’s beauty in a bower of Egypt.
The poet’s eye, in a fine phrenzy rolling,
Doth glance from heaven to earth, from earth to heaven;
And as imagination bodies forth
The forms of things unknown, the poet’s pen
Turns them to shapes, and gives to airy nothing
A local habitation and a name.”

SHAKESPEARE.

The imaginations exercise a great and important influence over organic life, and the very worst forms of disease have been induced by a vivid imagination. And why should they not? If close attention to mercantile and scientific pursuits can produce an inflammation of the brain, why may not the same effect be produced by the same amount of labor, although bestowed upon a work of fancy? The poet, who labors to create a world and peoples it with his imaginations, taxes, to as great an extent, his mental energies, as he who labors in the mere matter of fact business of life. The individual who is most given to mental labor, no matter whether the subject be real or imaginary, is the most apt to suffer from derangement of health.

Our imaginations are so susceptible to powerful excitement, that we can fancy our bodies affected with almost any disease, while at the same time it

is perfectly free from it. Skillful physicians are well aware of the controlling influence of the mind over disease, and by a correct knowledge of this influence they perform more wonderful cures than those who give the most powerful medicines.

1. "Quacks," says a writer, "take advantage of breaking disease by operating upon the mind, and practicing the greatest imposition upon the credulity of his patients. An individual of this kind, who was famous in an enlightened part of New England, and whose practice extended over a district of forty miles in diameter, was called to a lady who had been suffering greatly for some hours without any prospect of relief. She had been attended from the first by an experienced physician, but from the great cures of the celebrated nostrum monger, her friends dispatched a messenger to have him forthcoming. He came, saw the patient, and retired into a private room with the gentleman in attendance, when the following conversation occurred :

"Well, doctor, how long have you been here?"

"About eighteen hours, and there is no more prospect of relieving the patient than when I first came."

"Well, doctor, I can tell you what will cure her to a certainty."

"What is it?"

"You must first promise that you will not tell what it is."

"I must first know what it is before I make the promise, or before I consent that the patient shall take it."

"Well, it is milk and water, sweetened with molasses."

"How do you propose to administer this powerful medicine?"

"Give her a tablespoonful every two minutes exactly, till she has taken five doses, and in twenty minutes she will be relieved."

"Do you advise to have the patient know what she is taking?"

"No, to be sure I do not; tell her it is some powerful medicine, that it has cured hundreds of similar cases, and that it will cure her to a certainty."

"Why do you wish to impose upon this poor woman, by administering this inert mixture, with such strong assurances of relief, when all you assert of its efficacy is false?"

"Not so false as you think, my learned doctor; all the imposition there is about it, is in making her believe it is a powerful medicine, while it is something that cannot hurt her, but accomplishes the desired end by the help of faith."

"As there is no danger of doing mischief, I have no objection of trying your quackery to the extent you propose."

"Call it quackery, or anything else that you like, but you will find for once that another prescription than your own will do some good."

With all due formality, the mixture was prepared, and the prescriber, with the utmost gravity and an appearance of great concern, which he well knew how to assume, approached the bedside of the patient.

"Well, madam," said he, "I find your case at-

tended with great danger, but when I tell you that, I feel warranted in saying that I believe we have a remedy for your situation, and one which will speedily place you in a state of safety."

"Do you really believe, doctor, that there is any help for me?"

"O, most certainly, if you will but consent to take the medicine."

"Anything, doctor, what is it?"

"Indeed, madam, it is not important that you should know, although this much I feel constrained to tell you, that it is a medicine of great power and singular efficacy, and if you do take it fearlessly, in twenty minutes, I promise most unhesitatingly, your sufferings will be at an end."

The sweetened milk and water was accordingly taken, and to the great joy of her friends, she was speedily relieved, and once more restored to health and happiness."

2. The following experiment, if true, illustrates very clearly the effect of vivid imagination upon the human body: Three London physicians agreed to find some healthy man, and see what the reiterated assurance that he was sick would produce. In the following manner they carried their conceived plan into operation. They went to a road passing over an extensive plain, and a road which was thronged with countrymen crowding into the metropolis, proceeding along a considerable distance from each other; the first looked earnestly for some suitable subject for their experiment. He had not proceeded far before he met a stout man driving a team, who appeared the very picture of health. "Good morn-

ing, my friend," said the physician, "you look too sick to be so hard at work, sir." "Sick," answered the countryman, "I was never sick a day in my life." "Indeed," said the physician, "that is bad, such persons seldom survive the first illness. I advise you my friend to take care of yourself. I am afraid you are not long for this world." The physician then rode on.

The countryman began to feel alarmed. He felt his forehead to ascertain if he was feverish—thought he felt some peculiar sensation of the brain, and a little nausea at the stomach. He had not advanced far on the road before the second physician met him. "Friend," said he, "I hope you have not far to travel to-day, you look as though you ought to be in bed rather than at work." "I do feel rather strange; I am afraid I am going to be sick." "Going to be sick," said the physician, "if you were one of my patients, I should fear you were never going to be well again. If you value your life at all, I advise you to go home as quick as possible and send for a physician."

The countryman now began to feel that he was a sick man. Fainting and trembling he proceeded on a little further, when the third physician met him. He eyed the countryman for a moment with an earnest gaze, and then remarked, "You must hold your life pretty cheap, my friend, to be out as sick as you are; you look as though you had just escaped from the coffin." The poor countryman could no longer stand it. His knees trembled and his head grew dizzy, and he was carried into a house and placed in a bed a sick man. And it was the

unanimous opinion of the physicians, that if the deception had not been explained, he would have died.

3. Many persons have from dreams, or from the predictions of a fortune-teller, imbibed the belief that they must die at a certain time. The impression has been so powerful as to be itself the cause of sickness and death. An instance of the power of imagination in this respect, is given by Stuart, in his journal of a residence at the Sandwich Islands—one of the most interesting books in our language :

“A thief,” he says, “was put to flight from our yard one day while we were at dinner. A lad joined in the chase and seized the culprit, but lost his hold by the tearing of his outer garment. The thief was greatly exasperated, and immediately engaged a sorcerer to pray the boy to death. Information of this reached the lad in the course of the afternoon, and we soon perceived him troubled by the intelligence. The next morning he did not make his appearance with the other boys, and upon inquiring for him, they said he was sick. We asked the nature of his sickness, to which they replied, that he was sick from the prayer of the sorcerer. We found him lying in one corner of the house—pale with fear, trembling like an aspen leaf, and discovered that he had not slept during the night. We were satisfied that the whole arose from his imagination, and compelled him, notwithstanding his declaration that he was sick, to come from his retreat—diverted his mind—set him to work, and before noon he was as full of life and spirit as ever.”

Such are some of the effects of vivid imagination

upon the body. Persons who are of a highly imaginative temperament, will do well if they desire health and happiness, to keep *it* under the strict control and guidance of the more matter of fact faculties of the mind. Many individuals have imaginations so polluted, that unless they are continually on their guard, they are betrayed into various excesses, which have a direct tendency to destroy the health and produce premature old age and death.

XV.

Alcohol:

ITS NATURE AND INJURIOUS EFFECTS UPON THE HUMAN SYSTEM.

THE art of extracting alcohol from fermented liquor was discovered about nine hundred years since, by an Arabian alchemist. When it was first discovered, no person knew what the production was, nor was there any language that had for it even a name. The Arabians, however, called it ALCOHOL; this is its chemical name in every country, to this day. Alcohol, in the language of that country, was a fine impalpable powder, with which the ladies used to paint their faces for the purpose of increasing their beauty, and in order to appear to be what they were not. And if any under the poisonous influence of alcohol really thought that they were more beautiful than they were under the influence of that only which God made as a beverage for mankind, they were deceived. But they were not more so than have been thousands since their day, who, under the idea of being benefited by drinking ardent spirits, have lived and died under its influence and gone down to a drunkard's grave.

Many individuals suppose that alcohol is a natural product, and may be considered as one of the "good

creatures of God." We cannot admit this proposition. For this article does not exist, nor is it to be found among the living works of God. Those substances, however, which contain sugar, after they are dead, and have become subject to those laws which then operate on inanimate matter, in the incipient stage of decomposition, undergo a process called *vinous fermentation*. By this a new substance is formed—ALCOHOL. The elements by the combination of which this is formed existed before, but the substance which this combination forms did not before exist. It is an entirely new substance, and is altogether different in its nature and effects from what existed before. It was formed not by the process which operates in the formation of living matter, but by that which operates on a certain kind of matter only after it is dead. This is the intoxicating agent of all fermented liquors, brandy, rum, gin, whisky and the like. It is composed of the following chemical constituents:

Hydrogen, -	-	-	-	-	13.04
Oxygen, -	-	-	-	-	52.17
Carbon, -	-	-	-	-	34.79 parts to a hundred.

And is in its nature, as manifested by its effects, an exceeding subtle and diffusive poison.

Many persons who are ignorant of chemistry, suppose that there is some alcohol in all vegetable substances, at least in all whose fermentation after death will produce it. But this is an entire mistake. Not a living vegetable under heaven, so far as has yet been ascertained, contains a particle of it. It does not exist in any living substance. It is formed only by vinous fermentation. After it has been

thus formed it can be extracted in a number of ways. The most common method, is by the application of heat, as in ordinary distillation.

All medical writers agree in classing this article among the NARCOTIC POISONS. Mr. Brande, one of the first chemists in England, says, "ardent spirit is composed of alcohol and water in nearly equal proportions, and is as destructive to life as henbane, deadly night-shade, hemlock, and various other poisons."

Dr. Johnson, editor of the London "Lancet," one of the ablest conducted medical journals in Europe, says "that alcohol is a poison of the very same nature as prussic acid, producing the same effects, killing by precisely the same means, paralyzing the muscles of respiration, and so preventing the necessary changes of the black into the vermilion blood."

Dr. Kirk, a distinguished physician of Scotland, in speaking of the nature of ardent spirits, says, "All of them contain as a basis, alcohol,—a narcotic stimulant, possessing properties of the kind that opium does, which you know to be a poison, with this addition—that it is more immediately irritating to those tissues of the human body to which it is applied than opium is."

The celebrated Dr. Mussay, of Cincinnati, Ohio, says: "That a person may be in the habit of taking ardent spirits, and may yet survive and enjoy tolerable health, is no proof that it is not poison. Will any man pretend to deny that arsenic is a poison; yet there are in Germany a number of farmers who are in the habit of making a daily use of arsenic. One man carried this habit so far as to take two

grains of arsenic into his system daily, and said that he could by no means dispense with it. Yet does any individual believe that a person may indulge in such a habit and not have his life shortened by it? Men should clearly understand the distinction between nutriment and poison; and if much poison does much harm, a little does a little."

Dr. Alden, in an essay on the injurious effects of ardent spirits, tells us that on every organ they touch they operate as poison. "The blood," he says, "by its circulation conveys to each part of the body the materials of which it is composed, while each organ is endowed with the power of selecting from the mass what it needs for nourishing, and the performance of its appropriate functions, and of rejecting the refuse to be thrown out of the system. The blood is, therefore, a sort of common carrier, conveying from part to part what is intrusted to it, for the common benefit. When obliged to carry spirit, it presents it on its way, as it does other materials, to each organ; and each organ starts with mighty effort, not to welcome and receive, but to repel it. And if not crippled by the over-powering force of the enemy, it succeeds; and it is rejected, not suffered to stop, because it is worthless; the carrier, though vexed with its burden, is obliged to take it on to the next; rejected by that, it must carry it on till, rejected by all as a common nuisance, it is siezed upon by the scavengers of the system, and unceremoniously excluded. This is not for any want of kindness in the system toward friends, but because ardent spirit is an enemy—a mortal enemy. It would be treason to harbor it, and suicide to use

it. Nature through unerring laws stamped by the Divine hand, true to herself and God, is incapable of such an offense, and till poisoned and perverted by the enemy will never submit to it. On every organ it touches, alcohol is a poison; and as such it is chased from organ to organ, marking its course with irregularity of action and disturbance of function, exciting throughout the system a war of extermination, till the last remnant of the intruder is expelled from the territory; till the vital forces of the system are prostrated, the enemy can never have a lodgment. And if, through decay of organic vigor by the mighty force of the intruder, or the long continuance of the war, and by a perpetual succession of new recruits, it cannot be expelled, the work of death is done, the last citadel of life surrenders, and the banner of universal ruin waves over all."

Its effect upon the mind clearly demonstrates its poisonous character. Its habitual use tends directly to harden the heart, sear the conscience, pollute the affections, and corrupt the morals of mankind. It has been shown time and again, that it causes three-fourths of all the crimes that are committed, and that it changes gigantic strength to pigmy weakness, celestial order to infernal discord, and heavenly purity, light and love, to hellish pollution, darkness and hate. Depravity it depraves, and makes villainess still more vile. It increases all the mischief which sin and Satan have occasioned in the soul, while with a mighty force it counteracts all the beneficent designs of Jehovah for its deliverance from sin, and its restoration to the dignity and beauty of his image.

Such is the nature of alcohol, and such are some of its legitimate effects when used by mankind as beverage. And in view of such fearful consequences, why is it, I would ask, that we find so many who are willing to run the risk of losing their temporal and eternal all by tampering with this article? There surely must be some reason for this. There must be something about the habit of drinking alcohol which has a powerful charm, or so many would not be deluded by its witchery.

Its stimulating properties unquestionably constitute its chief attraction as a beverage. This is its first effect. It quickens, excites and animates the whole system. This, by a fundamental law of our physical nature, is a source of pleasure. This present pleasure, the victims of this delusion mistake for permanent real good. It also arouses for a moment the reserved and dormant energies of the system, which are not needed, and were not designed for ordinary healthful action, but were intended to be kept for special emergencies, and which cannot be drawn out and used on ordinary occasions. This awakening of dormant energy, men mistake for an increase of real strength. But on both of these points they are entirely deceived. As well might they conclude that because the delirium of a fever sometimes arouses into action dormant energy—and the man who before had hardly life enough to raise a hand for a moment, puts on the strength of a giant, that therefore disease and delirium are a source of permanent strength, as to draw any such conclusion concerning alcohol. Whatever the present appearance may be, the violation of the laws of

our physical system is ever attended with pain. So with the use of alcohol as a beverage. Whatever the present enjoyment may be, to use the language of divine inspiration, "at last it biteth like a serpent and stingeth like an adder, and whosoever is deceived thereby is not wise."

After all, says one, I do not care what you say about the poisonous nature of alcohol, and its injurious effects upon the system; it increases my pleasures and makes me feel more happy. We have seen instances in which it seemed to remove poverty and increase riches, and other desirable things. I remember having read an anecdote of this kind. A poor man who was in the habit of daily using ardent spirits, greatly to his own injury and that of his family, was entreated by a rich neighbor to renounce his injurious habit. He had abandoned it himself, and found himself greatly benefited, and he wished his neighbor to do it also. But the poor man gave this as a reason why they did not think alike on the subject: "You," said he, "are a rich man, and of course have no need of taking it; you are rich enough, and feel rich enough without it. But I am a poor man; and no body likes always to feel poor; and when a man has taken a little, he feels five hundred dollars richer than he did before!" But let us reflect, is he any richer? is his family any richer? or is it all a delusion? Delusion; but not more real than the men experience in the other case, who because it gives them present strength, imagine that it does them real good. It gives to men the pleasure and profit of deception. And oh! how many thousands, urged on by the desire of

present pleasure, have looked "on the wine when it is red, when it giveth its color in the cup, when it moveth itself aright;" "who have tarried long at the wine, and have gone to seek mixed wine;" and thus "have woe, have sorrow, have contentions, have wounds without cause, and redness of eyes." Believe me, my friends, when I say that alcohol, no matter under what form you may please to take it, is the fellest fiend that ever led man to destruction. The great adversary of man has no minister of evil so faithful and so successful among all his demoniac host. His dwelling is near to the gates of death.

But some of you may ask, why it is that this habit of drinking alcohol has such a powerful hold upon its votaries; and, also, why it is that when a man once commences to indulge in the use of it, as a general thing he will increase the quantity he takes until he becomes a confirmed inebriate? The reason of this is obvious. The functions of the body, having been over-excited by this poison, become deranged, and having been over-worked, without any new strength communicated, they are of course debilitated, and therefore soon flag, become tired and exhausted. Now, according to a particular law of our physical system, there is pain, languor and uneasiness spread through the system, as suffering nature, under the awful abuse which has been practiced upon her, cries out for help. A man cannot thus chafe, irritate and exhaust his system, and not afterward feel uneasiness, any more than he can put his hand into the fire and not feel pain. He violates a law established by God, and must suffer the penalty consequent upon such a transgression.

Hence arise two motives to drink again. One is to obtain past pleasure, and the other is to remove the present pain. But as the system is unstrung and partly worn out, and is lower down than it was before, the same quantity will not the next time raise it up so high, nor cause the wearied organs to move so briskly. Of course it will not fully answer the purpose, will not give so much present pleasure, or produce so much effect as before. Hence the motive to increase the quantity, and for the same reason in future to increase it still more. As every repetition increases the difficulty, and also throws new obstacles in the way of its removal, the temptation to increase the quantity grows stronger and stronger. The natural life of the system constantly diminishes, and in order to seem to live, what there is must be more and more highly roused, till in one-half, or one-quarter, or one-eighth of the proper time, the whole is exhausted, and the man sinks prematurely to the grave.

There is another principle which tends strongly to the same result. The more any man partakes of this unnatural and guilty pleasure, which alcohol occasions, the less susceptible he becomes of the natural and innocent pleasures occasioned by the use of nourishing food and drink; by the view and contemplation of the works of creation and providence; by the exercise of the social affections, and the discharge of the various duties of life. It disinclines the mind to look at God, and incapacitates it not only for the spiritual, but also for the natural pleasures which his works and ways are adapted to afford. Hence a person under its power becomes

more and more destitute of all enjoyment, excepting that afforded by his ignoble habit. And thus by the allurements of his sole pleasure on the one hand, and the terrors of awful wretchedness on the other, he is urged on to temporal and eternal ruin.

But how, I hear you still ask, does alcohol produce premature decay and death? We have already shown that from its very nature alcohol is unfit for the purposes of nutrition. It is not in the power of the digestive organs to even decompose it, or change it into material capable of being converted into blood, or any thing by which the body is or can be nourished, strengthened and supported. When taken into the stomach, it is taken up by the absorbent vessels and carried into the blood, and with that is circulated through the whole system, and to a certain extent is then thrown off again. But it is alcohol when taken, it is alcohol in the stomach, it is alcohol in the arteries and veins, heart, lungs and brain, and among all the minute tissues of the body, and it is alcohol when, after it has passed the entire rounds of the circulation, it is thrown off again. Take the blood from any part of the body of a man who uses it as a beverage, and distill it, and you have alcohol. Not a blood vessel however minute, not a thread of the smallest nerve in the whole animal fabric escapes its influence; it produces nothing but evil, and that continually.

It is no way suited as an article of diet, nor should ever be used as such. All the organs of the body have as much labor to perform as is consistent with their healthful action, when they have nothing to dispose of but suitable food and drink. Nature designed that they should all in that case be diligent

in business, and in the structure of the human body she has given them as much work as they can perform in the proper disposal of suitable diet, and yet remain permanently healthy, and preserve life to the longest time. And if you withhold from them their proportion of that which is nourishing, and thus lessen their strength, or load them with that which is not nourishing, and thus increase their labor, you necessarily produce premature decay and death.

But in most instances where alcohol is indulged in to excess, it causes death by the special diseases it induces in the corporeal organs. Let us briefly contemplate its effects upon some of these organs. Look first, then, to its effects upon the *stomach*. The office of this organ is to digest the food and to prepare its nutritious parts for absorption into the blood. This it does chiefly by means of the juices which are formed in its coats, to be mixed with and dissolve the food. When these coats become diseased and secrete an unhealthy fluid, indigestion and a host of ills too numerous to be mentioned, immediately ensue. The stomach, of all the organs of the body, is more subject to chronic than acute inflammation, therefore the injurious effects of ardent spirits upon this organ are extremely silent in their progress, frequently proceeding great lengths before they are discovered.

On an examination of this organ after death, in those who have been noted for their indulgence in alcoholic drinks, it is generally found to exhibit signs of disease approaching a state of inflammation—with its vessels enlarged and filled with black blood; and particularly those of the mucous coat, which gives the internal surface of the stomach the

appearance of purple or reddish streaks, resembling the livid patches seen on the face of the inebriate. The coats of the organ are also found greatly thickened and corrugated, and so firmly united as to form one inseparable mass. In this state its walls are sometimes increased in thickness to the extent of an inch or more, with marks of ulceration and cancerous deposits.

“I have never,” says a celebrated physician, “dissected the stomach of a drunkard, in which the organ did not manifest some remarkable deviations from its healthy condition. But the derangement of the stomach is not limited to the function of nutrition merely. This organ is closely united to every other organ, and to each individual tissue of the body, by its sympathetic relation. When the stomach, therefore, becomes diseased, other parts suffer with it. The functions of the brain, the heart, the lungs, and the liver, become disordered; the secretions are altered, and all the operations of the animal economy are more or less affected.”

Disease of the *liver* is also one of the most common complications of habitual drunkards. This organ, like the stomach, is more subject to chronic than acute disease. Hence, under the influence of chronic inflammation, it has been frequently known to enlarge to double its natural size, and yet the individual at first suffers comparatively little inconvenience. But as the system becomes weakened, the consequences which follow are very distressing, and frequently fatal. The bile is not secreted in due quantity or quality, therefore digestion is defective; the skin becomes dry and rough, the bowels costive, and as the enlargement goes on, the free passage of

the blood in the veins is impeded, and their extremities throw out *lymph*; this accumulation forms what is commonly called dropsy, a disease with which a greater proportion of drunkards are more or less affected. The liver sometimes becomes so much enlarged from this cause, as to occupy a great part of the cavity of the abdomen, and will weigh from eight to twelve pounds, when in its normal condition it will not weigh more than four or five pounds.

The *lungs*, also, suffer much injury from the habitual use of alcohol as a beverage. The lungs of the inebriate after death, are frequently found adhering to the chest, hepatized or affected with tubercles. This latter affection is produced in two ways: first, by the immediate action of the alcohol upon the air cells; and second, by its debilitating effect upon the stomach and liver, and by its general effects upon the organs of nutrition.

The *heart* is frequently affected by the intemperate use of alcohol. Although it does not come so directly under its injurious effects as some of the organs already noticed, yet it seldom ever escapes disease under the habitual use of alcohol. It undoubtedly promotes thickening of the valves of the heart, as well as the development of other organic affections of that organ.

But of all the injurious effects of alcohol upon the local organs, there are none more formidable than its effect upon the *brain*. The brain, you know, is the organ of the mind. It is through it and by it that the faculties of the mind are manifested; under the integrity of the brain, then, must depend all its healthy actions, and when that is diseased, the mind

must be proportionately affected also. It is a universal fact, which has been verified by examination after death, that the brains of inebriates become changed in structure, and have their organization altered from their natural healthy state. The brain in such cases is found to be converted from the soft pulpy state which it exhibits in health, into a harder and more firm consisteney, while its blood vessels are very much reduced in size, and less transparent than usual. The membranes of the brain are slightly thickened, attended with more or less effusions in its cavities.

When these changes once take place in the brain, they produce a perfect revolution in the character of the individual. He, for instance, who was once amiable and affectionate, is now petulant and cruel; he who was marked for his clear faculties of perception, reason and judgment, is now distinguished for the opposite. He seems, in fact, not to retain his identity; everything is so altered that he no longer derives enjoyment from the sources that he once did. The whole world to him has become transformed, and he fancies that his friends and companions are alienated from him, that his family connections seek to injure him, and that even the wife of his bosom, the object of his first love and mother of his children, is faithless to her vows, and, under this delusion, he will sometimes add to the crime of drunkenness that of murder.

But perhaps some may ask—Is it not possible that a man may indulge to a considerable extent in the use of ardent spirits, and yet enjoy health and attain a good old age? In reply I would answer, it is quite possible. A man may suffer shipwreck once and

again, and finally, notwithstanding the dangers of the sea, die a quiet, peaceful death on shore. But few, comparatively, possess so happy a conformation of body, such vigor of constitution, as to resist the injurious effects of alcohol; and those who do escape, are as fortunate as he who comes unscathed from the field of battle.

Alcohol, as we have seen, produces disease in a slow and imperceptible manner. A man, for instance, may drink quite freely for five or ten years and not feel his general health and strength much impaired, and may even boast of his strength, yet he is not aware that there is an insidious poison lurking in his system which only wants some slight cause to call it into action, and in a few short hours he will pass beyond that bourne from whence no traveler returns. If by chance his health continues good, in case of bodily injury, or where a surgical operation is necessary, the difficulty is greatly augmented; or if disease supervenes from natural and uncontrollable causes, the evil is at once fully developed; a disease, mild in itself, in the abstinent free from danger, often assumes the most alarming aspect, and will sometimes produce the most dreadful suffering the human body is capable of enduring.

Let every individual, then, who cares for his personal health, pleasure or comfort, or who regards his obligation to his Maker or to his fellow men, or who appreciates his own interest, his children's welfare, or the rights of succeeding generations, use his utmost endeavors to discountenance the habitual use of intoxicating drinks in health, under any circumstances, in any quantity, and under whatever name or form they be disguised.

XVI.

Tobacco:

ITS NATURE, THE VARIOUS MODES OF USING IT, AND ITS EFFECTS
UPON THE PHYSICAL AND MORAL NATURE OF MAN.

THE habit of using tobacco as a luxury was first introduced to the civilized world about three hundred years since, by Ralph Lane and his associates, who, by a constant intercourse with the Indians of our country, had acquired a relish for their favorite enjoyment of smoking the baneful weed, to the use of which the Indians ascribed a thousand imaginary virtues. Since that period, this habit has attained a degree of celebrity among civilized nations that is almost incredible. So much so, indeed, that in some countries this habit has become so common, that children smoke before they learn to walk, and grown-up people have carried it to such an excess, that they frequently fall down senseless, and often die in consequence.

In the materia medica, tobacco is classed among those medicines called *narcotics*, and in its effects upon the system it differs not essentially from those of alcohol and opium, except that neither the first excitement nor subsequent depression is so great. In full doses, tobacco, whether by smoke or infusion,

is a most deadly poison. A very moderate quantity introduced into the system — even applying the moistened leaves over the stomach, has been known very suddenly to extinguish life. The Indians were well aware of its poisonous effects, and accustomed, it is said, on certain occasions, to dip their arrows in an oil obtained from the leaves, which, being inserted into the flesh, occasioned sickness and fainting, or even convulsions and death.

In whatever form tobacco may be employed as a luxury, a portion of its active principle mixes with the saliva, and invariably finds its way into the stomach, and disturbs or impairs the functions of that organ ; hence all of those distressing affections — nausea, pain in the head, vertigo, &c. which are produced on first using it. And it is only by the most rigid perseverance that many systems can overcome these distressing effects, when acquiring the habit of its use ; and the fact that many do overcome them, may be adduced as an illustration of the perversion of taste, as well as the capability of the system to be so educated as to receive with pleasure what was at first disagreeable, and to bear with impunity what was at first injurious.

Dr. Rush, in his observations on this habit, makes use of the following language: “ Were it possible for a being who had resided upon our globe to visit the inhabitants of a planet where reason governed, and tell them that a vile weed was in general use among the inhabitants of the globe it had left, which afforded no nourishment—that this weed was cultivated with immense care—that it was an important article of commerce—that the want of it produced

real misery—that its taste was extremely nauseous—that it was unfriendly to health and morals—and that its use was attended with considerable loss of time and property, the account would be thought incredible, and the author of it would be excluded from society for relating a story of so improbable a nature. In no view is it possible to contemplate the creature man in a more absurd and ridiculous light, than his attachment to TOBACCO.”

The most common methods of using tobacco are by *smoking*, *chewing*, *snuffing* and *snuff rubbing*.

OF SMOKING.—Of all the modes of using tobacco, this, certainly, is the most delightful and benevolent. Here there is manifested none of that contracted disposition to selfishness: when a man smokes he does it for the benefit of his friends. The inhalation of smoke from a rank cigar, or what is still better, a pipe grown old in the service, is peculiarly grateful, and as rum-drinking and smoking often accompany each other, the fumes of the tobacco mingled with the steam of rum render the enjoyment doubly exquisite.

The most common affections of this method of using tobacco, are tremor of the limbs, obscurity of vision, determination of blood to the head, fetid breath, loss of teeth, cancer of the lip and tongue, various inflammatory disorders of the tonsils and windpipe, which sometimes speedily terminate in suffocation. Percy relates the case of an individual who was advised to smoke to dissipate, or at least to diminish the tumefaction with which his tonsils were affected, succeeding frequent attacks of cold and sore throat. He did so, and at the end of two

weeks he was obliged to have one of them cut off, and the other scarified deeply to prevent immediate suffocation.

Paralysis is also a common effect of this mode of using tobacco. "There is another habit," says Dr. Solly, in his lecture on paralysis, delivered to the students of St. Thomas' Hospital, London, "in which my patient indulges, and which I cannot but regard as the curse of the present age. I mean smoking. Now, don't be frightened, my young friends; I am not going to give a sermon against smoking, that is not my business, but it is my business to point out to you all the various and insidious causes of general paralysis—smoking is one of them. I know of no single vice which does so much harm as smoking. It is a snare and delusion. It soothes the excited nervous system at the time, to render it more feeble ultimately. It is like opium in that respect, and if you want to know all the wretchedness which this drug can produce, you should read the 'confession of an opium eater.' I can always distinguish by his complexion a man who smokes much, and the appearance which the face presents is an unerring guide to the habits of the man. I believe that cases of general paralysis are more frequent in England than they used to be, and I suspect that smoking tobacco is one of the causes of the increase."

OF CHEWING.—This may be regarded as the most deleterious form of using tobacco, and is sometimes accompanied with the most dangerous and fatal diseases. The waste of saliva is greater than in smoking, and the derangement of the digestive

organs proportionably severe. All inveterate chewers are more or less subject to long standing diseases of some of the principal organs of the body. The recital of the following cases will give the reader some just conception of the pernicious tendency of this form of using the noxious weed.

A distinguished clergyman had acquired the habit of chewing when quite young, and continued the practice for a number of years, but found by experience his health materially impaired, being often affected with sickness, lassitude and faintness. His muscles also became flabby and lost their tone, and his speaking was seriously interrupted by elongation of the *uvula*. He was advised by his physician to discontinue the use of his tobacco. He laid it aside. Nature, freed from its depressing influence, soon gave signs of returning vigor, which resulted in his perfect restoration to health.

A lawyer of my acquaintance, who stands very high at the bar, while arguing a very important case was suddenly seized with the most alarming vertigo, which continued, at intervals, for three or four months, attended with disorder of the stomach and a relaxation of the nervous system, which is always the result of a too free use of tobacco. After consulting several physicians, and taking a variety of medicines, with cupping and severe blistering, to little or no purpose, he was finally prevailed upon to relinquish the deleterious practice. In a short time vertigo left him, and he soon recovered his usual health.

There is not the least doubt but, in very many instances, the habitual excessive use of tobacco,

either by smoking or chewing, very seriously injures the brain and nervous system, and sometimes produces an effect resembling that of delirium tremens, induced by alcoholic stimulants. Medical authors have mentioned cases of this kind. The late Dr. Chapman, of Philadelphia, informed Prof. Wood that he had witnessed several instances of delirium resulting from tobacco, like the delirium produced by the use of ardent spirits, which ceased upon the omission of the drug. Even insanity has been ascribed to the use of tobacco in the mode now under consideration. And who should wonder at this, seeing the effect that it has upon the brain. If, my young friend, you wish to enjoy clearness of perception, strength of memory, soundness of judgment and purity of mind, ignore and discard, at once and forever, the use of tobacco in any and every form.

OF SNUFFING.—The habit of snuff-taking is one of the most injurious practices that popular custom has sanctioned as harmless. Many prefer this to all the other modes of using it; and some inveterate snuffers understand the anatomy and physiology of the nose so well as to greatly enhance the luxury of the practice—they use but one nostril at a time, thus keeping one fresh and in health when the sensibility of the other becomes blunt. One important and most happy end is attained by the practice of snuffing, and if no other good resulted from it, this alone should commend it to our admiration and compel us to speak in its favor. I mean nothing less than destroying the supernumerary sense of smell, which a kind Providence (with reverence be

it spoken,) bestowed upon us through some mistaken notions of usefulness or benevolence. It is fully and clearly demonstrated by the results from snuff-taking, that the other senses are quite sufficient for the purposes of life, and we can, therefore, very well dispense with this.

If the practice of snuffing only destroyed the sense of smell and injured the tone of the voice, which it unquestionably does, the injury done to the system would be comparatively trifling. But the damage is more extensive in its character; and I am well convinced that it has rarely occurred to those who use snuff the most largely, that it is an agent possessing qualities that cannot fail to prove highly deleterious to the healthy tone of the digestive organs. Those who use this article do not advert to the route by which the noxious material finds its way into the stomach. It is a fact that snuff is often forced by the strong act of inhalation through the nostrils into the gullet, and through it into the stomach, where it often collects in large quantities, owing to its indigestible nature, (being frequently adulterated with ammonia, salt urine and ground glass,) and produces many aggravated and incurable diseases. It is said that Napoleon Bonaparte derived the cause of his protracted suffering and eventual death from the large quantity of snuff which he used. His disease was a cancerous affection of the *pylorus* of the stomach.

But aside from the injury which snuffing has upon the sense of smell and the digestive organs, it has also a tendency to give a determination of blood to the head, and on this account plethoric subjects

should be the very last ever to indulge in the habit. If it were attended with no other inconvenience, the black, loathsome discharge from the nose, and swelling and rubicundity of this organ, with other circumstances equally disagreeable, ought to deter every man from becoming a snuffer.

Some nameless bard has said, with more truth than poetry, that

“Tobacco is an Indian weed;
An *evil spirit* sowed the seed.
It wastes our money, spoils our clothes,
And makes a dust-hole of the nose.”

DIPPING AND RUBBING SNUFF.—All that has been said of the noxious effects of tobacco will apply to this filthy and disgusting habit. Tobacco, when reduced to powder, is more easily dissolved and mixes with the saliva more readily, and of course is absorbed with more facility, and is capable of inflicting as much injury upon the system as when used in smoking or chewing. And I have seen wretched victims to this habit, who were little better in the scale of suffering than those who have fallen a prey to the intemperate use of ardent spirits.

THE INFLUENCE OF TOBACCO UPON SOCIETY.

If the various forms of using tobacco just noticed only injured the corporeal organs of mankind, the damage would be of little moment; but the injury stops not here, it debases the intellect, and seriously impairs the morals of mankind. Let us briefly notice its effects upon morals and society.

1st. All who use tobacco, either moderately or excessively, know that one of its most common

effects upon the body is thirst. This thirst cannot, in many cases, be allayed by water; for no sedative, or even insipid liquid, will be relished after the mouth and throat have been exposed to the stimulus of the smoke or juice of tobacco. A desire of course is excited for strong drinks, and these, when moderately indulged in, soon lead to intemperance and drunkenness.

2d. The use of tobacco, more particularly in snuffing, destroys a great deal of valuable time. Perhaps few who use snuff have ever examined this part of our subject. On an average, every professed inveterate and incurable snuff-taker, at a moderate computation, takes one pinch in ten minutes. Every pinch, with the agreeable ceremony of blowing and wiping the nose, and other incident circumstances, consumes a minute and a half. One minute and a half out of every ten—allowing sixteen hours to a snuff-taking day—amounts to two hours and twenty-four minutes out of every day, or one of every ten; one day out of every ten, amounts to thirty-six days and a half in a year. Hence, if we suppose the practice to be persisted in forty years, two entire years of the snuff-taker's life will be dedicated to tickling his nose, and two more to blowing it.

3d. The use of tobacco begets a want of cleanliness. Cleanliness is one of the first moral virtues, and has been enforced in both the Jewish and Mohammedan law as part of their religious observances. No uncleanly person was allowed to enter the congregation and worship God; they were strictly forbidden. But in our day, when men profess to be governed by a superior light, they are permitted to

enter the sacred temple with their mouths well crammed with the weed, and bespatter themselves, their neighbors, the seats and floor, with their disgusting saliva. Such filthy conduct is certainly a breach of good manners. No individual, I presume, will question that manners have an influence upon morals; they may be considered as the outpost of virtue. A habit of offending the sense of individuals with whom we associate, by the use of tobacco, cannot therefore be indulged in with innocence. It produces a want of respect for our fellow men, and this always disposes to unkind and unjust behavior toward them. Who ever knew a rude man uniformly moral?

4th. The use of tobacco causes a useless expenditure of money. We are told by a distinguished writer, "that in 1840, 1,000,000 persons, one-tenth of the entire population of the United States, were engaged in raising and manufacturing tobacco, and at the present time not less than 2,000,000 persons are thus employed. The tobacco crop of the United States in 1840 was very nearly 200,000,000 pounds. And if we take into account the waste of land and labor in raising it, the expense attending its manufacture and traffic, with the loss of time occupied in smoking and chewing it, and the consequent idleness and indolence it begets, \$40,000,000 would be a low estimate of the present annual loss to the nation; a sum sufficient to provide every district of our country with a free school, every hamlet with a free church, and every pauper with a free home.

"The consumption of cigars alone in the city of New York, in 1851, was computed at \$10,000 a day,

while the whole city paid but \$8,000 a day for bread. This would be \$3,650,000 a year for cigars alone. The grand Erie canal, three hundred and sixty-four miles long, the longest in the world, with its eighteen aqueducts and eighty-four locks, was made in six years, and cost but little over \$7,000,000. The cigar bill of New York city would have paid the whole in two years. If a line of Atlantic steamers, the pride of the ocean, were all sunk, how soon would the cigar money of that one city rebuild the whole! It is a very moderate cigar-smoker who spends only six cents a day, yet it amounts to \$21.90 a year—a sum which would be called an enormous tax, if laid on a young man for the purpose of government or the support of religious institutions. The same trifling sum, if put to annual interest, would, in thirty years, amount to \$3,529.30; and who does not wish that cigars were banished from the world, when he thinks in how many hundred ways this sum might have contributed to the real comfort and improvement of a man in moderate circumstances; or how much good it might have done, if laid out educating and elevating his children?

“If the tobacco consumption of the United States goes on in future increasing as it has for twenty years past, have we not reason to fear that the nation of native scheming, inventive, enterprising, efficient Yankees, flying all over the world, will be actually smoked down to a nation as phlegmatic and stationary as the smoking Dutchmen of Holland?”

We have thus briefly considered the nature of tobacco, and its injurious effects upon the human system and upon society generally. We are well

aware that we have omitted many things in regard to its pernicious effects, yet sufficient has been said to convince any man who is not lost to reason, that it is a habit which cannot fail to injure the body and soul for time and eternity.

Much has been said by writers in relation to the best remedy for this pernicious habit. Some would seek a substitute, and others would break off by degrees. But the most effectual way to overcome the tobacco habit is to break off at once, and then rigidly follow that good and sound rule—*touch not, taste not, handle not*. “Charlatans,” says Dr. Shew, “may go about, as indeed they have done, pretending to have some secret remedy by which the tobacco appetite may be permanently destroyed, but all such pretense is from the father of lies. If through reason, conscience and religion, a man cannot break off this habit, his case is forever a hopeless one. A season of sickness is an excellent one in which to commence the reform; because under such circumstances nature, ever true to herself, takes away all longing for the odious drug. True, no one should wait for such an opportunity, but when it does occur let it be improved.”

A NEW REMEDY FOR TOBACCO CHEWING—AN ANECDOTE.

Gen. T. of New York, a gentleman of known wealth and liberality, was not long since called upon by a person to obtain his signature on a petition for the abolition of capital punishment. The person unfolded his papers and documents, and presented and enforced his arguments in rather a tiresome set speech, stopping occasionally to deposit a mouthful

of tobacco juice upon a nice parlor carpet. Gen. T. was in favor of diminishing capital punishment, but doubted the propriety and expediency of it in all cases. At the expression of this opinion, his visitor began to bridle up and prepare to lay down his arguments with greater force; and in order to give greater facility to his enunciation, he took from his mouth a huge quid of tobacco and threw it upon the white marble hearth, saying he wished the General would be so good as to inform him in what cases capital punishment could even be justified or defended.

"Well," said the General, "it strikes me that if we were to abolish capital punishment, there are two cases which should be exceptions."

"Two cases, are there?" said the petitioner, "well I should like to have them stated and the arguments for them."

"The first," said the General, "is that of clear, cold-blooded, premeditated murder. I think the person who lies in waiting or in ambush, with malice prepense, and takes the life of his fellow creature, ought to forfeit his life in return. He deserves to be hung."

"Well, I have abundance of arguments to meet that case," said the visitor; "now I should like to know what is your other case."

"The other case," said the General, "is that of the animal that walks on two legs, calls itself a man, and carries a mouthful of disgusting filth into a clean parlor and scatters it over the hearth. Such a being is certainly not fit to live in decent society, and I do not know of any better or more ready way

of getting rid of him, than to hang him. With these two exceptions, I think I should be willing to sign your petition for the abolition of capital punishment."

The visitor gathered up his papers and thrust them into his pocket, and with a very blank look hastily withdrew. He has not called since to receive the General's signature.

XVII.

Opium:

ITS NATURE, AND EFFECTS UPON THE BODY.

OPIUM is obtained from the white poppy, a plant which is found in almost every garden; but in this country it is cultivated more for ornament than utility, and I am aware of but a few instances in which it has been raised with a view of obtaining its opium. In some parts of Turkey, Egypt and Hindostan, it is cultivated extensively, and is an important article of commerce. The white poppy is a hardy plant, and in some climates grows with the greatest luxuriance, and produces an abundance of opium. This is especially the case in some parts of Turkey. In that country the mode of cultivating it is as follows: the seeds are sown in October and November, they are generally planted about six or eight inches apart, and when young are supplied with plenty of water; but when it has attained six or eight inches in height, it is watered more sparingly. When it has reached the height which has been mentioned, large quantities of ashes and dirt scraped from the highways are placed about the roots, and when it is nigh flowering, it is watered most profusely, to increase the juice. When the heads are half

grown, the cultivator takes a knife and makes two longitudinal incisions upon each head, passing from below upward; this operation is repeated every evening, until each head has received six or eight wounds. The juice is white as milk, and as it issues from the incisions it adheres to the head; it is then scraped off the capsules with an iron spoon, and deposited in earthen pots, where it is worked in the open sunshine by the hands until it becomes quite hard, when it is formed into cakes, and stowed away in earthen jars, covered with tobacco or poppy leaves, and dried until it is fit for sale. In this shape it is most generally imported into this country, from Smyrna and Constantinople, and occasionally from Egypt.

Opium has been used by physicians for a great variety of purposes, but its chief value as a medicine consists in its anodyne properties. When taken in small doses for medical purposes, it produces at first some excitement of the pulse and increased heat of the body; after an interval, varying from a quarter to half an hour, slight fullness in the head is felt, with numbness in the limbs, disinclination to stir, indisposition to attend to the impressions of external sense, a succession of vague, fleeting ideas, and the departure of pain; sleep soon succeeds, and continues for six or eight hours; and this is followed for some hours longer by listlessness, giddiness and languor of the pulse, or sometimes also sickness, want of appetite, and headache. Such are some of the general effects of a medical dose of opium, when the individual composes himself to sleep. But if the first approaches of drowsiness be successfully

resisted, the tendency to sleep soon passes off in many persons; and the pulse continuing full and firm while pain as well as other uneasiness takes its departure, the faculties become clear, the ideas brilliant, precise and under control, the power of application more intense, the conversational energies improved, and the muscular movements facilitated. After some hours a stage of drowsiness ensues, similar to that which occurs in the first instance. During the prolonged excitement of the nervous system here described, it seems probable that the particular manifestations of the excitement are directed partly by constitutional peculiarities, but occasionally, too, by an effort of the will. And thus, one man becomes a lively, conversable member of a social circle; another applies with energy to the labors of literary composition; another, in placid indifference to every thing around, indulges in a trip to the realms of fancy; and another, turning his mind to the expression of what is passing within him, performs a series of extravagant, irregularly connected acts, presenting in some measure the phenomena of intoxication.

Let us look for a moment at its effects when taken in doses sufficient to extinguish life: these are generally giddiness, stupor, and those of sudden depression of all the powers of life. The sleep that quickly follows appears at first deep and perfect, the breathing is slow and soft, the eyes are shut and the pupils contracted; by degrees, however, the sleep assumes the semblance of that caused by compression of the brain; and it is sometimes accompanied by stertorous breathing, as in apoplexy. There are also the same cold sweats, and occasionally con-

vulsions; but the state of the pulse differs greatly from that attending apoplexy, being small and less frequent, instead of full and quick. As the influence of the poison increases, the countenance becomes ghastly, the pulse feeble and imperceptible, the muscles relaxed, and death follows. Sometimes no apoplectic symptoms supervene, but the fatal event steals on imperceptibly, and the person expires as if in a deep and sound sleep. This event may occur in from six to twelve hours after the poison has been taken, but it may take place at a much earlier period, as the following case will show:

“Mrs. —, aged 52 years; intemperate, has been drinking more or less for three weeks. An ounce of laudanum was taken by the patient, with suicidal intent. A physician saw her in fifteen minutes; she said she had taken the laudanum for diarrhoea; was able to walk about with little or no assistance, begged to be allowed to lie down. Nothing in pulse peculiar as to the force and frequency; pupils natural, and also external temperature. Emetics of zinc were given without effect. In thirty minutes after taking the laudanum, she began very suddenly to lose her pulse and muscular power; slight spasms were observed, the lips became livid; there was spasmodic dropping of the lower jaw; the extremities were cold, and in ten minutes she was unmistakably dead.” Thus death occurred in *three quarters of an hour* after taking the laudanum.

It is said by some medical observers, that if an individual survives the twelfth hour after taking a poisonous dose of opium, he usually recovers; but it has been known to terminate fatal at a much later

period. Where death occurs speedily, as in the case just cited, the individual undoubtedly dies from the immediate influence of the poison on the brain, as in some forms of apoplexy, but as a general thing, death results from the vast prostration of the nervous power consequent upon the previous excessive excitement; and if the individual can be supported through this period of collapse, he will perhaps recover. From a quantity just insufficient to cause death, the prostration following the congestion is extreme; but at the lowest point, the system begins to react and gradually returns to health, though frequently through a series of nervous disorders and variously deranged function, which clearly indicate the powerful strain which the brain has suffered—a strain which sometimes destroys its healthy action during the remainder of the individual's life.

Although the quantity of opium necessary to suspend vital action must always vary with circumstances, and especially by the habits of the individual, yet death has been frequently known to follow the taking of a very small dose. Dr. Christison, in his treatise on poisons, records a case in which death took place in an adult man from four grains and a half of opium with nine grains of camphor; whereas half a fluid ounce of laudanum has been repeatedly known to be taken by persons not accustomed to the use of opium, without such a result. Death, however, has been known often to occur from quantities varying from half a fluid ounce of laudanum to two or three fluid ounces, or from about twenty grains to one or two drachms of opium. Infants are peculiarly susceptible to the poisonous influence

of the drug, and I have often seen the most alarming effects produced by exceedingly small doses. I remember a case that occurred in my practice, a few years since, where two drops of laudanum given to a child ten months old produced a narcotism which lasted for eighteen hours, in spite of every thing that I could do to relieve it. Dr. Alison, of Edinburgh, has seen death result in a child a few weeks old from four drops of laudanum, and two and a half drops kill another child three days old. Dr. E Smith, in the London Medical Journal, mentions an instance where *one-twentieth* of a grain of opium proved fatal to an infant six days old, in eighteen hours after the administration of the dose.

The conclusion to be drawn from the above remarks is, that the greatest caution should be observed in using this drug as a medicine, particularly when it is to be administered to children. It may not be known to most readers, that the preparations of paregoric and Godfrey's cordial all contain opium. The practice that some parents are in of giving these compounds to their children, is one that deserves the severest censure. These compounds, when given to a certain extent, derange the digestive organs of children, and being thus early deranged they with great difficulty resume their healthy action. But their injurious effects upon the digestive organs is no more to be dreaded than it is upon the mind, which it renders comparatively feeble and inert, a state from which it is doubtful whether it ever entirely recovers.

Annexed is a case from the note book of a physician, which may, perhaps, prove a valuable lesson to

those mothers and nurses who are fond of giving this drug to the tender beings committed to their care:

“*January 19th, 183—*. Early this morning I was called in by Mr.—, on Fourth street, to see an only child, said to be extremely ill of croup. Upon arriving at the house I found the little patient, a beautiful and well formed boy of sixteen months of age, upon the lap of a nurse, an elderly matron, apparently insensible, his countenance blue, his face swelled or bloated, and his breathing deep, long, irregular and stertorous. The nurse informed me that when she first awoke, she found him rubbing his nose, and hence she concluded he might have worms as well as croup. Upon examining the case, it appeared that the mother of the child had gone to a party at eight o'clock, on the previous evening, leaving her child playful and well, and that when she returned, which was at a late hour, she retired without inquiring into its condition. It was asleep with the nurse, and hence she supposed that all was well, until she was aroused in the morning by its deep and difficult respiration. Its parents as well as visitors thought it now in the last stage of croup. *The nurse had seen many in the same situation*, and could not therefore be mistaken. To me, however, it was apparent there was no inflammation in the case. The child had evidently taken a powerful narcotic, and from the time which elapsed since it was administered, as well as from the deep congestion of the lungs and brain, it was probably beyond the possibility of cure. As the nurse appeared to be extremely alarmed for the safety of the child, inquiring most anxiously whether it could

recover, I came to the conclusion that she was not entirely ignorant of the cause of its present situation. I therefore took her aside and informed her that it had taken a large portion of either opium or laudanum, and that it could only be relieved by a full knowledge of all the facts in the case. At first she declared in a most solemn manner that she had not given it anything, but when informed that the truth could be easily ascertained by an examination after death, she admitted she had at first given it a small portion of paregoric—all that was in the vial—an hour or two after the departure of the mother, in order to keep it quiet, as it cried continually for her return. As this did not have the desired effect, she gave it a small pill of opium, after which they both fell asleep. I inquired where she got the opium. She replied she always kept it with her, as paregoric or Godfrey's cordial had little or no effect upon some children, who were so very cross, that she could not sleep without its aid. When questioned as to the size of the pill, she said it was not larger than a pea. I then informed her that the child must die, but agreed not to expose her, if she would promise never to administer opium again, in any form, without the advice of a physician. To this proposition she readily assented, and called Heaven to witness that her promise should never be violated. She evidently did not intend to injure the child. She only wished to keep it quiet with as little trouble as possible. All the means of cure known to physicians in such cases were immediately resorted to, but the poison had taken too deep a hold upon the nervous system. All my efforts to rescue it from an untimely grave

proved abortive, and in twenty minutes it ceased to breathe."

One of the most remarkable things connected with this wonderful drug yet remains to be described, namely, its diminution of power by habitual use. It is a well known fact, that the habit of taking opium diminishes its influence upon the system, and doses which in other cases would be absolutely poisonous, are taken by persons who have been in the habit of using it, with impunity. This is fully illustrated in the case of opium eaters, as they are commonly called, or those who take it habitually for its stimulant action upon the nervous system. Three ounces of laudanum is a common daily allowance, and an ounce a frequent dose after long indulgence in the vice; nine ounces a day have been taken by some, and an instance is known where twice that quantity was consumed for several weeks. This is astonishing, when we contemplate that under ordinary circumstances *forty drops* of laudanum is a large dose to be taken at one time. The habitual use of this drug undoubtedly injures the health and shortens the period of human life. This is abundantly proved by the picture of the opium eaters and smokers of the East, as drawn by travelers.

We are informed by several writers, that in some parts of the East houses are kept on purpose for the accommodation of those who indulge in the use of this potion. The following is a description of one of these places in the island of Singapore: "The rooms where they sit and smoke are surrounded by wooden couches, with places for the head to rest upon, and generally a side room is devoted to gambling. The

pipe is a reed about an inch in diameter, and the aperture in the bowl for the admission of the opium is not larger than a pin's head. The drug is prepared with some kind of conserve, and a very small portion is sufficient to charge it, one or two whiffs being the utmost that can be inhaled from a single pipe, and the smoke is taken into the lungs. On a beginner one or two pipes are sufficient to produce the effect desired, but an old stager will continue to smoke for hours. At the head of each couch is placed a lamp, as fire must be held to the drug during the process of inhaling, and from the difficulty of filling and properly lighting the pipe, there is generally a person who waits upon the smoker to perform the office. A few days of this fearful luxury, when taken to excess, will give a pallid and haggard look to the face; a few months, or even weeks, will change the strong and healthy man into little better than an idiot skeleton. The pain they suffer when deprived of the drug, after long habit, no language can explain; and it is only when to a certain degree under its influence their faculties are alive. In the houses devoted to their ruin, these infatuated people may be seen at nine o'clock in the evening in all the different stages. Some entering half distracted to feed the craving appetite they had been obliged to subdue during the day; others laughing and talking wildly under the effects of a first pipe; whilst the couches around are filled with their different occupants, who lie in languor, with an idiot smile upon their countenance, too much under the influence of the drug to care for passing events, and fast merging

to the wished for consummation. The last scene in this tragic play is generally a room in the rear of the building, a species of dead-house, where lie stretched those who have passed into the state of bliss the opium-smoker madly seeks—an emblem of the long sleep to which he is blindly hurrying.”

Dr. Maddan thus describes what he saw of the effects of opium, in the confirmed opium-eater, in the coffee houses of Constantinople. “Their gestures were pitiful; those who were completely under the influence of the opium talked incoherently, their features were flushed, their eyes had an unnatural brilliancy, and the general expression of their countenances was horribly wild. The effect is usually produced in two hours, and lasts four or five; the dose varies from three grains to a drachm. I saw an old man take four pills, of six grains each, in the course of two hours. I was told he had been using opium for five and twenty years. But this is a very rare example of an opium-eater passing thirty years of age, if he commences the practice early. The debility, both moral and physical, attendant on its excitement, is terrible; the appetite is soon destroyed, every fibre in the body trembles, the nerves of the neck become affected, and the muscles get rigid. Several of these I have seen in this place, at various times, who had wry necks and contracted fingers, but still they cannot abandon the custom. They are miserable till the hour arrives for taking their daily dose; and when its frightful influence begins, they are all fire and animation. Some of them compose excellent verses, and others address the bystanders in the

most eloquent discourses, imagining themselves to be emperors, and to have all the harems in the world at command."

The same writer describes an experiment of his own with opium, in one of the coffee houses of the same city. He says: "I commenced with one grain. In the course of an hour and a half it produced no perceptible effect. The coffee-house keeper was very anxious to give me an additional pill of two grains, but I was contented with half a one; and in another half an hour, feeling nothing of the expected reverie, I took half a grain more, making in all two grains in the course of two hours. After two hours and a half from the first dose, my spirits became sensibly excited; the pleasure of the sensation seemed to depend on a universal expansion of mind and matter. My faculties appeared enlarged; every thing I looked at appeared increased in volume; I had no longer the same pleasure when I closed my eyes which I had when they were open; it appeared to me as if it was only external objects which were acted on by the imagination, and magnified into images of pleasure; in short, it was the 'faint exquisite music of a dream' in a waking moment. I made my way home as fast as possible, dreading at every step that I should commit some extravagance. In walking, I was hardly sensible of my feet touching the ground; it seemed as if I slid along the streets, impelled by some invisible agent, and that my blood was composed of some ethereal fluid, which rendered my body lighter than air. I got to bed the moment I reached home. The most extraordinary visions of delight filled my brain all night. In the morning I

rose pale and dispirited, my head ached, my body was so debilitated that I was obliged to remain on the sofa all day, dearly paying for my first essay at opium-eating."

There is not the least doubt, but the victim of this habit, when under its full influence, enjoys a peculiar elevation and expansion of mind that the lover of ardent spirits knows nothing about. When the opium-smoker is elevated to the ecstatic state, the images which flit before his diseased imagination are exquisite, brilliant and heavenly. It is the nepenthe prepared by the fair Helen, which so exhilarated the spirits of all who had the happiness to partake of it, that all care was banished for the time being from their benighted recollections. But when the effect has subsided, an emaciated nerveless creature is seen, with a cadaverous skin, eyeballs widely protruding, the voice weak and feeble, the countenance idiotic, and, in a word, all manly resolution fled under the withering blast of his ignoble habit. However repugnant to our minds may be the vice of indulging to excess in the use of ardent spirits, it is not more destructive and ruinous than this. However disgusting and repulsive to the eye of others, and injurious to the indulger in it, as is the chewing of tobacco, it is not more censurable, nor so much to be dreaded in its consequences, as the habit of taking opium to mitigate unpleasant feelings or remove melancholy.

In our own land the vice of opium taking is a solitary one. It is not, like ardent spirits, quaffed from the glass and the bowl amid songs and joyous shouts, but is quietly taken by idle and unhappy men, who

have lounged away the day in listlessness at home, in place of courting occupation and enlivenment by active exercise; or by the unhappy belle, whose pallid face and sunken eyes show the exhaustion of the midnight assembly and dance. They dare not hope for, they are sure they cannot obtain, the sweet sleep which follows industrious labor and useful exertion; but they must forget themselves; the day had for them sufficient horrors, without a wakeful night redoubling the store. What then, say they, remains for them to do, if not to take habitually this tempting drug. Those who are afraid to meet the summer's heat or winter's cold, whose nerves are too feeble to bear the slightest noise, and to have pain is dreadful even in idea, have no hesitation in thus daily swallowing a poison, each potion of which casually taken brings with it more bodily uneasiness and mental torture, than the longest day to the lashed galley slave. They may sleep the sleep of stupefaction, or dream themselves in paradise; but when they awake, fear, sorrow, suspicion, discontent, cares, weariness of life, surprises them in a moment, and they can think of nothing else; no sooner are their eyes open, but the infernal plague of melancholy seizes them and terrifies their souls, representing some dismal object to their minds, which by no means or persuasion they can avoid. Miserable resource from care or grief! to stupefy one's self with such a drug for a few short hours, only to awake in renewed despondency, with a mind paralyzed and unfit for the commonest duties of life.



Ad. B. Dutcher, M. D.

